MOUNT HOLLY TOWNSHIP SCHOOL DISTRICT
4th GRADE SCIENCE CURRICULUM

Revised to meet the June 2020 Science NJSLS-S
Board Approval: August 2022

Board Approved: August 17, 2022

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2020 New Jersey Student Learning Standards for Science (K-5)

2020 New Jersey Student Learning Standards for Science (6-8)

Intent and Spirit

The New Jersey Student Learning Standards for Science (NJSLS-S) describe the expectations for what students should know and be able to do as well as promote three-dimensional science instruction across the three science domains (i.e., physical sciences, life science, Earth and space sciences). From the earliest grades, the expectation is that students will engage in learning experiences that enable them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments (in appropriate ways relative to their grade level).

The foundation of the NJSLS-S reflects three dimensions — science and engineering practices, disciplinary core ideas, and crosscutting concepts. The performance expectations are derived from the interplay of these three dimensions. It is essential that these three components are integrated into all learning experiences. Within each standard document, the three dimensions are intentionally presented as integrated components to foster sensemaking and designing solutions to problems. Because the NJSLS-S is built on the notions of coherence and contextuality, each of the science and engineering practices and crosscutting concepts appear multiple times across topics and at every grade level. Additionally, the three dimensions should be an integral part of every curriculum unit and should not be taught in isolation.

Mission

All students will possess an understanding of scientific concepts and processes required for personal decision-making, participation in civic life, and preparation for careers in STEM fields (for those that chose).

Vision

Prepare students to become scientifically literate individuals who can effectively:

- Apply scientific thinking, skills, and understanding to real-world phenomena and problems;

- Engage in systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned;
- Conduct investigations, solve problems, and engage in discussions;
- Discuss open-ended questions that focus on the strength of the evidence used to generate claims;
- Read and evaluate multiple sources, including science-related magazine and journal articles and web-based resources to gain knowledge about current and past science problems and solutions and develop well-reasoned claims; and
- Communicate ideas through journal articles, reports, posters, and media presentations that explain and argue.

Three Dimensions of NJSLS-S

The performance expectations reflect the three dimensions and describe what students should know and be able to do. In layman's terms, they are "the standards." They are written as statements that can be used to guide assessment and allow for flexibility in the way that students are able to demonstrate proficiency.

The example below is provided to illustrate the interconnected nature of the NJSLS-S components.

Disciplinary Core Ideas and Performance Expectations

Disciplinary Core Idea	Performance Expectation
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.	Develop and use a model of the Earth-sun moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

Science and Engineering Practices

Developing and Using Models	Develop and use a model to describe phenomena

Crosscutting Concepts

Scale, Proportion, and Quantity	Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

Becoming familiar with the science practices and crosscutting concepts is a critically important first step in designing learning experiences reflective of the three dimensions. A description of each of the science and engineering practices and the cross-cutting concepts can be found in the next sections.

Further, for students to develop proficiency of the NJSLS-S, they will need to engage in learning experiences that are meaningful, cumulative, and progressive. Learning experiences designed to be meaningful, go beyond reading about science concepts and provide opportunities for students to be active learners and make sense of ideas. Cumulative learning experiences provide opportunities for students to use and build on ideas that they have learned in previous units. Progressive learning experiences provide multiple occasions for students to engage in ways that enable them to improve their construction of explanations and solutions over time by iteratively assessing them, elaborating on them, and holding them up to critique and evidence.

Scientific and Engineering Practices

Asking Questions and Defining Problems

A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify the ideas of others.

Planning and Carrying Out Investigations

Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.

Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria—that is, which design best solves the problem within given constraints. Like scientists, engineers require a range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and effective.

Developing and Using Models

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.

Constructing Explanations and Designing Solutions

The products of science are explanations and the products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.

Engaging in Argument from Evidence

Argumentation is the process by which explanations and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits.

Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to identify strengths and weaknesses of claims.

Using Mathematics and Computational Thinking
In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Statistical methods are frequently used to identify significant patterns and establish correlational relationships.

Obtaining, Evaluating, and Communicating Information
Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to acquire information that is used to evaluate the merit and validity of claims, methods, and design.

{NJDOE NJSLS-S January 2022}

New Jersey Technology Standards
2020 New Jersery Student Learning Standards: Computer Science and Design Thinking

New Jersey Career Readiness, Life Literacies, and Key Skills Standards
2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies & Key Skills

New Jersey Climate Change Standards
2020 New Jersey Student Learning Standards: Climate Change

Pacing Guide

Topic	Unit #	Unit Length
Energy	Unit 1	20 Days
Waves & Applications	Unit 2	14 Days
Molecules to Organisms	Unit 3	20 Days
Earth's Place in the Universe	Unit 4	13 Days
Earth's Systems	Unit 5	13 Days
Earth & Human Activity	Unit 6	15 Days

Science Unit 1: Energy Grade 4	
Unit Title	Energy
Recommended Pacing	20 Days
Unit Summary	In this unit of study, fourth-grade students develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents. The crosscutting concepts of cause and effect, energy and matter, and the interdependence of science, engineering, and technology, and influence of science, engineering, and technology on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade appropriate proficiency in planning and carrying out investigations and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

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Career Readiness, Life Literacies, and Key Skills Standards	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7) ● Curiosity and willingness to try new ideas (intellectual risktaking) contributes to the development of creativity and innovation. ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. ● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. ● 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
Computer Science and Design Thinking (Technology)	● The technology developed for the human designed world can have unintended consequences for the environment. ● 8.2.5.ETW.1: Describe how resources such as material, energy, information, time,

	tools, people, and capital are used in products or systems. ● 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ● 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ● 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Diversity, Equity, and Inclusion	● Videos featured individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● Core Idea 1: Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways. Some resources are renewable over time and others are not. ● Performance Standard 1: 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. ● Core Idea 2: Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. ● Performance Standard 2: 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost. ● Core Idea 3: Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. ● Core Idea 3: Different solutions need to be tested in order to determine which of them

	best solves the problem, given the criteria and the constraints. ● Performance Standard 3: 3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Supplemental Class Resources	- Generation Genius
	- Neapod
	- Mystery Science
	- BrainPop
	- iXL
	  - Predict Heat Flow
	  - Predict Temperature Changes
	  - Energy Transformation
	- Reading Wonders
	  - Unit 1 Week 6 - Crash Course

Disciplinary Core Idea	Performance Expectation
PS3.A: Definitions of Energy - The faster a given object is moving, the more energy it possesses. (4-PS3-1) Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) **PS3.B: Conservation of Energy and Energy Transfer** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion.	- Illustrate images of kinetic and potential energy. - Relate kinetic and potential energy to every day life through writing. - Interpret diagram of a roller coaster to show understanding of potential and kinetic energy. - Discover kinetic and potential energy through exploration stations. - Identify types of energy and categorize images. - Connect the idea of dropping different objects down ramp to show to show speed and friction. - Analyze two identical objects rolling down board that is

In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2), (4- PS3-3) Light also transfers energy from place to place. (4-PS3-2) Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4- PS3-2), (4-PS3-4) **PS3.C: Relationship Between Energy and Forces** When objects collide, the contact forces transfer energy so as to change the objects' motions. (4- PS3-3) **PS3.D: Energy in Chemical Processes and Everyday Life** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) **ETS1.A: Defining Engineering Problems** Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. *(secondary to 4-PS3- 4)*	smooth and bumpy - Design a pendulum and predict its motion - Collaborate to designmodels of amusement park rides to show potential and kinetic energy. - Discover the transfer of energy in collisions through virtual reality bumper cars and pendulum. - Discover balanced and unbalanced forces through tablecoth experiment. - Collaborate to invent a model for an egg drop to show transfer of energy in collisions. - Collaborate to design a Rube Goldberg machine to show transfer of energy. - Sketch model of Rube Goldberg machine to show transfer for energy. - Design paper bumper coasters and modify to show - Explore videos of electrical fields and identify electrical fields. - Discover electrical fields with balloon and wool cloth to understand electrical fields. - Identify forms of energy by creating an Energy Robot. - Articulate understanding of energy through energy walk.

Science & Engineering Practices	Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2) Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1) Apply scientific ideas to solve design problems. (4-PS3-4)
Articulation of DCI's Across Grade-Levels	● K.PS2.B (4-PS3-3) ● K.ETS1.A (4-PS3-4) ● 2.ETS1.B (4-PS3-4) ● 3.PS2.A (4-PS3-3) ● 5.PS3.D (4-PS3-4) ● 5.LS1.C (4-PS3-4) ● MS.PS2.A (4-PS3-3) ● MS.PS2.B (4-PS3-2) ● MS.PS3.A (4-PS3-1), (4-PS3-2), (4-PS3-3), (4- PS3-4) ● MS.PS3.B (4-PS3-2), (4-PS3-3), (4-PS3-4)

	• MS.PS3.C (4-PS3-3) • MS.PS4.B (4-PS3-2) • MS.ETS1.B (4-PS3-4) • MS.ETS1.C (4-PS3-4)
Crosscutting Concepts	• Energy and Matter Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4) Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering and Technology on Society and the Natural World Engineers improve existing technologies or develop new ones. (4-PS3-4) Connections to Nature of Science Science is a Human Endeavor Most scientists and engineers work in teams. (4-PS3-4) Science affects everyday life. (4- PS3-4)

Math Student Learning Objectives Covered in this Unit
4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)

ELA Student Learning Objectives Covered in this Unit
RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from

the text. (4-PS3-1)

RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1)

RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1)

W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4- PS3-1)

W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2), (4-PS3-3), (4-PS3-4)

W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources. (4-PS3-1), (4-PS3-2), (4- PS3-3), (4-PS3-4)

W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4- PS3-1)

Modifications

Unit 1 Modifications:

Gifted and Talented:

- Student choice for projects
- Access to higher level texts/ articles
- Research opportunities as an extension of content being taught
- Strategic small groups based on Reading level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on Reading levels
- Differentiated project options and assessments

At Risk Students/504 Plans:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:
https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit One: Energy	
NJ Student Learning Standards: Science Grade 4 **4-PS3-1 -** Use evidence to construct an explanation relating the speed of an object to the energy of that object **4-PS3-2 -** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **4-PS3-3 -** Ask questions and predict outcomes about the changes in energy that occur when objects collide. **4-PS3-4 -** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	**Length: 20 Days** **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** **highlight appropriate indicators for unit/domain** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Information, Media and Technology Skills** **highlight appropriate indicators for unit/domain**

	Information Literacy Media Literacy ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** **highlight appropriate indicators for unit/domain** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions: Where do we get the energy we need for life?
Learning Goals:

- I can explore different sources of energy and how they affect my life.
- I can investigate and describe forms of energy, including light, heat, sound, electrical, chemical and mechanical.
- I can explain that electrical energy can be transformed to other forms of energy.
- I can describe how energy can cause motion or create change.
- I can differentiate between kinetic and potential energy.
- I can differentiate between potential and kinetic energy.
- I can describe examples of potential and kinetic energy in my every day life.

- I can explore the differences between kinetic and potential energy. I can compare kinetic and potential energy and provide examples.

- I can explain the relationship between force and two types of energy, kinetic and potential energy.

- I can identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.
- I can recognize that energy has the ability to cause motion or create change.
- I can observe and identify repeating patterns of motion.
- I can recognize that the force of friction resisting on an object's motion can explain why that object slows downor stops.
- I can explore evidence for heat as a product of friction.
- I can explore how speed and kinetic energy are related and affected by different variables.
- I can conduct an experiment to explore this concept.
- I can explain and demonstrate that objects with greater speed hold greater energy.
- I can identify that force has both strength and direction.
- I can explore how unbalanced forces cause an object to change its motion.
- I can explore how balanced forces do not cuase a change in motion.
- I can identify that energy is the ability to make things happen.
- I can explore that moving objects transfer energy when it comes in contact with another object.
- I can demonstrate how making an object faster or heavier results in more energy transfer.
- I can explore that in a collision, some energy is converted into sound and heat.
- I can explore how energy can be stored as height
- I can apply my knowledge of energy to create a models.
- I can explore various forms of energy in the world and classify them based on my understanding of the concepts taught throughout the unit.

NJSLS Lessons:

Day 1: Introduction to Energy
Objective: I can explore different sources of energy and how they affect my life.
Essential Question: What is energy?
Materials: Science Notebooks, Pencil, Hershey Kiss, Chromebooks

Engage: Teacher will present the word “Energy” to the class. Students will have 5 minutes to write everything they know about energy. Class will share their thoughts.
Explore: Teacher will give students two chocolate kisses. What do you think will happen to a chocolate kiss in an opened hand vs. a closed hand. Students will put one chocolate kiss in an open hand and the other in a closed hand for 5 minutes. They will observe what happens and record their results. They will determine what questions they still have. Class will discuss how the human body is a natural source of heat energy.

Explain: Teacher will introduce different forms of energy based on the prior knowledge from the “engage” portion of the lesson. Class will watch the “Forms of Energy” BrainPop.

Elaborate: Class will work with a partner to sort different forms of energy on Seesaw.

Evaluate: Students will share one thing they learned from the lesson aloud with their peers.

Link to Lesson Activity: https://www.brainpop.com/science/energy/formsofenergy/
https://jr.brainpop.com/science/energy/energysources/
https://jr.brainpop.com/science/energy/heat/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students can write or draw anything that comes up when they hear the word energy.

Explore: Students will be given sentence starters to predict what they think will happen. Students can draw or write what happened throughout the experiment.
Explain: Students will watch the Brian Pop Jr. video.
Elaborate: Students will work in a small group with a teacher to sort different forms of energy on Seesaw. Students will have an anchor chart that explains each form of energy to reference.
Evaluate: Students will share one thing they learned from the lesson aloud with their peers.

Tier III:
Engage: Students can write or draw anything that comes up when they hear the word energy.
Explore: Students will be given sentence starters to predict what they think will happen. Students can draw or write what happened throughout the experiment.
Explain: Students will watch the Brian Pop Jr. video.
Elaborate: Students will work in a small group with a teacher to sort different forms of energy on Seesaw. Students will have an anchor chart that explains each form of energy to reference.
Evaluate: Students will share one thing they learned from the lesson aloud with their peers.

Day 2: Nearpod: Energy
Objective: I can investigate and describe forms of energy, including light, heat, sound, electrical, chemical and mechanical.
I can explain that electrical energy can be transformed to other forms of energy.
I can describe how energy can cause motion or create change.
I can differentiate between kinetic and potential energy.
Essential Question: How does energy cause change?
Materials: Chromebook

Engage: Students will answer the question: Do you know how energy is changed? On Nearpod. Class will discuss.
Explore: Class will discuss energy and watch a video of an orchestra performing. Students will identify forms of energy coming from instruments. Students will record their thoughts on Nearpod.

Explain: As an overview, class will explore what energy is and its forms. Class will work together to match the types of energy to their definitions. Then, class will watch a video on the forms of energy.
Elaborate: Students will play a game on the forms of energy on Nearpod. & Explore: Assess prior knowledge and explore how energy is. Then, they will discuss the conservation of energy as a class. Class will watch a video on how energy is transformed.
Class will discuss potential and kinetic energy and watch a video to enhance their understanding.
Evaluate: Students will draw a diagram of a roller coaster and label where the potential energy is the greatest and where the kinetic energy is the greatest. Students will reflect on their understanding of the lesson using a class poll.

Link to Lesson Activities: https://np1.nearpod.com/sharePresentation.php?code=fdacada441c79daef0357166294fcaf3-1

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students can answer the nearpod question through pictures, one word answers, text to speech or verbally to a teacher.
Explore: Students will be given a word bank to use when recording their thoughts on nearpod.
Explain: Pre-teach vocabulary words
Elaborate: No modifications. & Explore: Students will discuss conversation of energy in small group before discussing with the class.
Evaluate: Students will label a diagram of a rollercoaster to determine where potential and kinetic energy is at their greatest.

Tier III:
Engage: Students can answer the nearpod question through pictures, one word answers, text to speech or verbally to a teacher.
Explore: Students will be given a word bank to use when recording their thoughts on nearpod.
Explain: Students will have been pre-taught the vocabulary words.

Elaborate: No modifications. & Explore: Students will discuss conversation of energy in small group before discussing with the class.
Evaluate: Students will label a diagram of a rollercoaster to determine where potential and kinetic energy is at their greatest.

Day 3: Nearpod: Potential & Kinetic Energy
Objective: I can differentiate between potential and kinetic energy.
I can describe examples of potential and kinetic energy in my every day life.
Essential Question: What is the difference between kinetic and potential energy?
Materials: Chromebook, Paper, Pencil

Engage: Assess prior knowledge: What is energy and what are some kinds of energy?
Explore: Students will develop an understanding of kinetic and potential energy.
Explain: With a partner, students will label images of potential or kinetic energy.
Elaborate: Students draw two different things they like to do at lunch. Then, they label each as either potential or kinetic energy.
Evaluate: Students will answer the open ended question: When do you have kinetic energy? When do you have potential energy?

Link to Lesson Activities: https://np1.nearpod.com/sharePresentation.php?code=036f2015e96732a9276035fdd24bcbc8-1

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Pre-teach new vocabulary with visuals
Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explain: In a small group with a teacher, students will label images of potential or kinetic energy.
Elaborate: Students draw two different things they like to do at lunch. Then, they label each as either potential or kinetic energy.
Evaluate: Students will answer the open ended question using pictures, one word answers, text to speech or verbally.

Tier III:
Engage: Pre-teach new vocabulary with visuals
Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explain: In a small group with a teacher, students will label images of potential or kinetic energy.
Elaborate: Students draw two different things they like to do at lunch. Then, they label each as either potential or kinetic energy.
Evaluate: Students will answer the open ended question using pictures, one word answers, text to speech or verbally.

Day 4: Potential & Kinetic Energy Stations

Objective: I can explore the differences between kinetic and potential energy. I can compare kinetic and potential energy and provide examples.

Essential Question: How can I demonstrate kinetic and potential energy in my everyday life?

Materials: Ruler, Marbles, Science Notebook, Pencil, Marble Lab Worksheet, Empty Soda Can, Chalk, Balloons, Dominoes,

Engage: Class will review their understanding of kinetic and potential energy by working with a partner to come up with a real life example.

Explore: Each pair will get a ruler and three marbles. Students will place two marbles next to each other in the groove of a ruler. Students will predict what will happen when you roll a third marble at the two marbles? Students will share their predictions with the class. Then, they will perform the experiment and record their observations in their science notebook, using the guiding laboratory worksheet.

Explain: The class will discuss how the marble got its energy and why this demonstrates the change of energy. This will lead into the discussion of kinetic and potential energy. Kinetic energy is energy of motion and is active. Potential energy is stored energy and is inactive, waiting to be released.

https://www.brainpop.com/science/energy/kineticenergy/

https://www.brainpop.com/science/energy/potentialenergy/

Elaborate: Students will do a variety of short activities to observe the transfer between potential and kinetic energy.

Jumping Jacks - Students will stand still with their hands at their sides for 10 seconds. Then, students will do 10 jumping jacks. Students will determine which type of energy was exhibited when standing still (potential) and when jumping (kinetic).

Twirling Can - Sit an empty soda can on the desk. What type of energy is being demonstrated while the can isn't moving? Now, spin the can in a circle. What type of energy do you see now?

Domino Cascade - On a flat surface, set up a domino so that it sits up on end. Space the rest of the dominoes out so that each domino is just far enough apart so that they have the potential to knock down the next domino. Once all dominoes are set up, record what type of energy they currently have. Students will flick the first domino with their finger so that it tips over backwards. This should set off a chain reaction of falling dominoes. What type of energy was it then?

Flying Balloons - Blow up a balloon and hold it still for 10 seconds. Does this air-filled balloon have energy? (Yes, potential). Let it go. What happened? What type of energy was demonstrated when the balloon flew? (kinetic)

Chalk Drop - Take a piece of chalk and hold it at 3 inches above the floor. Predict what will happen if you drop it. Drop it, observe, and record the result. Now hold it up over your head. What will happen if the chalk is dropped? Why was the second time more damaging? It started from a greater height, giving it more potential energy to turn into kinetic energy.

Evaluate: Through each activity, students will determine the type of energy used and explain their thoughts. In addition, students will complete a lab report for each activity, going through the scientific method in order to draw a conclusion. Each lab will be discussed and questions will be asked throughout.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: Students will label two pictures as either potential or kinetic energy.

Explore: Students will fill in their predictions and observations using drawings, sentence starters and a word bank.

Explain: Students will watch brain pop videos with the class.

Elaborate: No modifications.

Evaluate: Students will be given a word bank to use in order to answer the lab questions.

Tier III:

Engage: Students will label two pictures as either potential or kinetic energy.

Explore: Students will fill in their predictions and observations using drawings, sentence starters and a word bank.

Explain: Students will watch brain pop videos with the class.

Elaborate: No modifications.

Evaluate: Students will be given a word bank to use in order to answer the lab questions.

Day 5: Nearpod: Force & Energy in Action

Objective: I can explain the relationship between force and two types of energy, kinetic and potential energy.

I can identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.
I can recognize that energy has the ability to cause motion or create change.
Essential Question: What forces create movement and how does this process relate to the different types of energy?
Materials: Chromebook

Before teaching - Preview vocabulary terms

- Force
- Kinetic Energy
- Potential Energy

Class will use vocabulary terms to fill in the blank.

Engage: Do you think something can have energy even if it's not moving? Why or why not?
Explore: Students will explore the different forms of energy: chemical, thermal, mechanical, radiant, electrical, nuclear
Explain: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Elaborate: Class will look at a picture of a child sliding down the slide. Class will discuss how force is acting on him and what kind of energy the child has at that moment.
Then, students will participate in a "Think-Pair-Share". If he was still sitting at the top of the slide, what kind of energy would he have?
Evaluate: Students will identify what type of energy goes with what image. Then, they will find a partner to complete a quiz as the team.
Open Ended Question - In your daily life, when do you have potential energy and when do you have kinetic energy?What kinds of activities are associated with each type of energy?
Class will watch three videos. Students will make a list of predictions based on what they think will happen.
Open-Ended Question: How does force create movement? Can you give some examples?
Students will take a quiz based on the information they learned.
Students will wrap up the lesson with a reflection poll to show their understanding of the concepts taught in the lesson.

Link to Lesson Activities: https://np1.nearpod.com/sharePresentation.php?code=f9af223a340901aba4166039518b2507-1

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: Go over vocabulary words from previous lessons using visuals. When answering questions on the nearpod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explore: Students will explore with the class.
Explain: Think about how you got to school today. How many different types of energy were used? Come up with as many as you can, and be ready to share your answers with the class.
Elaborate: Class will look at a picture of a child sliding down the slide. Class will discuss how force is acting on him and what kind of energy the child has at that moment.
Then, students will participate in a "Think-Pair-Share". If he was still sitting at the top of the slide, what kind of energy would he have?
Evaluate: Students will identify what type of energy goes with what image. Then, they will find a partner to complete a quiz as the team.
Open Ended Question #1 - Students will have the opportunity to answer verbally, using sentence starters or drawing a picture.
Class will watch three videos. Students will make a list of predictions based on what they think will happen.
Open-Ended Question #2: Students will have the opportunity to answer verbally, using sentence starters or drawing a picture.
Students will take a quiz based on the information they learned.
Students will wrap up the lesson with a reflection poll to show their understanding of the concepts taught in the lesson.

Tier III:

Engage: Go over vocabulary words from previous lessons using visuals. When answering questions on the nearpod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explore: Students will explore with the class.

Explain: Think about how you got to school today. How many different types of energy were used? Come up with as many as you can, and be ready to share your answers with the class.
Elaborate: Class will look at a picture of a child sliding down the slide. Class will discuss how force is acting on him and what kind of energy the child has at that moment.
Then, students will participate in a "Think-Pair-Share". If he was still sitting at the top of the slide, what kind of energy would he have?
Evaluate: Students will identify what type of energy goes with what image. Then, they will find a partner to complete a quiz as the team.
Open Ended Question #1 - Students will have the opportunity to answer verbally, using sentence starters or drawing a picture.
Class will watch three videos. Students will make a list of predictions based on what they think will happen.
Open-Ended Question #2: Students will have the opportunity to answer verbally, using sentence starters or drawing a picture.
Students will take a quiz based on the information they learned.
Students will wrap up the lesson with a reflection poll to show their understanding of the concepts taught in the lesson.

Day 6: Nearpod: Force & Energy in Action Extension
Objective: I can explain the relationship between force and two types of energy, kinetic and potential energy.
I can identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.
I can recognize that energy has the ability to cause motion or create change.
Essential Question: What forces create movement and how does this process relate to the different types of energy?
Materials: Playground, Penny, Marshmallow, Ball, Stopwatch
Engage: Students will go out to the playground to do an experiment that will clarify the relationship between force, motion, and energy.
Students will use experiment organizers to make predictions to record the outcome.

Engage: Students will make a prediction as to how fast each item will go when they drop it down the slide.
Explore: Then, students will drop the ball, penny, and marshmallow down the slide. Students will record the time it takes for each item to reach the bottom.
Explain: Students will record their results on the graphic organizer.

Elaborate: Students will find another object on the playground and determine if they think it will be faster or slower than the fastest object used.
Evaluate: Class will return to the classroom to debrief from the experiment and submit their organizers.

Link to Lesson Activities: https://np1.nearpod.com/sharePresentation.php?code=f9af223a340901aba4166039518b2507-1

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Experiment organizers will have fill in the blanks and a word bank for students to complete.
Explore: Students will work in small group with a teacher to assist with recording the time for each.
Explain: Students will have fill in the blanks on their recording worksheets.
Elaborate: Students will pick between a list of objects on the playground and determine if they think it will be faster or slower than the fastest object used.
Evaluate: No modifications.

Tier III:
Engage: Experiment organizers will have fill in the blanks and a word bank for students to complete.
Explore: Students will work in small group with a teacher to assist with recording the time for each.
Explain: Students will have fill in the blanks on their recording worksheets.
Elaborate: Students will pick between a list of objects on the playground and determine if they think it will be faster or slower than the fastest object used.
Evaluate: No modifications.

Day 7: Generation Genius - Patterns of Motion & Friction
Objective: I can observe and identify repeating patterns of motion.
I can recognize that the force of friction resisting on an object's motion can explain why that object slows downor stops.
I can explore evidence for heat as a product of friction.
Essential Question: What causes objects to move and slow down?
Materials: Wooden board, Toy cars or toy balls, Glue, Sand, Access to playground, Stuffed animal, Masking tape, Science notebooks, Pencils

Engage: Class will observe two identical cars or balls rolling down a wooden board, half covered in sand. Class will discover that the car on the sandy side will move more slowly than the car on the clean side.
Explore: Students write about what they think happened during the experiment they observed. Class will go out to the playground. Class will make predictions about the magnitude and direction of motion. Class will discuss motion.
Explain: Class will watch the Generation Genius Patterns of Motion and Friction Video as a group. Class will discuss using discussion questions.
Elaborate: Students will create a pendulum. Students will predict the motion of the pendulum as instructed in the video. (extension)
Evaluate: Students will explain why the experiment the observed occurred.

Link to Lesson Activities: https://www.generationgenius.com/videolessons/patterns-of-motion-and-friction-video-for-kids/

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions

- Small group instruction as needed

Tier II:
Engage: Pre-teach vocabulary words from lesson.
Explore: Students will verbally say what they saw happen.
Explain: Students will be given leading questions to help them answer the discussion questions.
Elaborate: Students will work in a small group to complete this experiment with a teacher.
Evaluate: Students will explain why the experiment the observed occurred verbally or drawing pictures.

Tier III:
Engage: Pre-teach vocabulary words from lesson.
Explore: Students will verbally say what they saw happen.
Explain: Students will be given leading questions to help them answer the discussion questions.
Elaborate: Students will work in a small group to complete this experiment with a teacher.
Evaluate: Students will explain why the experiment the observed occurred verbally or drawing pictures.

Day 8: Mystery Science: Speed & Energy
Objective:
Essential Question: How is your body similar to a car?
Materials: Twist-O-Matic Printout, Twist-O-Matic Challenges Workseet, Crayons, Hardcover Books, Rulers, Scissors, Rubber Bands, Small Binder Clips

Engage: Students will answer the question: How is your body similar to a car? In their science notebooks. Class will share.
Explore: Students will begin the exploration through the Mystery Science video where they will learn that we use energy from food to make our bodies move just like cars use energy from gas.
Explain: Students will discuss how amusement park rides get their energy.

Elaborate: Students will build paper models of the Twist-o-matic Tester which is a replica of an amusement park ride. Class will discuss how energy is stored and test various sizes of rubber bands. Students will record results on their lab sheet.
Evaluate: Class will discuss their findings.

Link to Lesson Activity: https://mysteryscience.com/energy/mystery-1/speed-energy/304

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students will use sentence starters, one word answers, answer verbally or by drawing a picture.
Explore: Students will watch the video with the class.
Explain: Students will discuss how amusement park rides get their energy.
Elaborate: Students will work with a partner to complete this activity.
Evaluate: Class will discuss their findings.

Tier III:
Engage: Students will use sentence starters, one word answers, answer verbally or by drawing a picture.
Explore: Students will watch the video with the class.
Explain: Students will discuss how amusement park rides get their energy.
Elaborate: Students will work with a partner to complete this activity.
Evaluate: Class will discuss their findings.

Day 9: Nearpod: Speed & Energy
Objective: I can explore how speed and kinetic energy are related and affected by different variables.
I can conduct an experiment to explore this concept.
I can explain and demonstrate that objects with greater speed hold greater energy.
Essential Question: How can we analyze the energy of an object?
Materials: Chromebook

Engage: Students engage in a real life situation about a door being stuck. Class discusses. Then, class will review learning objectives and answer: "What is your favorite ride at an amusement park?" In their science notebooks.
Explore: Class will watch virtual reality video of bumper cars. Students will describe what they saw and discuss how speed affects collisions.
Explain: Class will discuss speed and explore a virtual pendulum. Students will draw their findings.
Elaborate: Students will discuss speed and kinetic energy's relationship. Then, students will continue to explore the pendulum given different scenarios. Class will discuss the transfer of energy, watch a video and match speeds to kinetic energy levels.
Evaluate: Students will take a quiz to show what they have learned. Then, they will reflect upon their learning.

Link to Lesson Activities: https://np1.nearpod.com/sharePresentation.php?code=e510c9063f85ba5e98eddcdd299f5c6a-1

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students will draw or find a picture of their favorite amusement park ride.

Explore: No modifications.
Explain: Students will draw their findings.
Elaborate: Students will explore in a small group with a teacher.
Evaluate: Students will reflect using pictures and drawings.

Tier III:
Engage: Students will draw or find a picture of their favorite amusement park ride.
Explore: No modifications.
Explain: Students will draw their findings.
Elaborate: Students will explore in a small group with a teacher.
Evaluate: Students will reflect using pictures and drawings.

Day 10: Generation Genius - Unbalanced & Balanced Forces
Objective: I can identify that force has both strength and direction.
I can explore how unbalanced forces cause an object to change its motion.
I can explore how balanced forces do not cuase a change in motion.
Essential Question: How does the strength and direction of forces lead to motion?
Materials: Science Notebooks, Pencils, Water, String, Scissors, Plastic Cups (one per four students), Eggs (t least one per four students), Metal or Plastic Plate (pie pan - at least one per four students), Toilet paper tubes (at least one per four students, bouncy ball

Engage: Class will answer pre-assessment questions in their science notebooks or aloud as a group.
Teacher will show a video of a tablecloth being pulled off a table without disturbing the place setting. Teacher will explain how pushes and pulls, forces, cause them to move or not to move.
Explore: Students will explore tablecloth phenomena. Class will play “tug of war”. Students work in pairs and use string and adjust forces through experiment. Students will record predictions in science notebooks for each scenario.
Explain: Class will watch a Generation Genius episode.
Elaborate: Class will conduct an egg drop. Students will determine what works and what does not.

Evaluate: Students will explain the forces involved in the egg drop demo.

Link to Lesson Activities: https://www.generationgenius.com/videolessons/balanced-and-unbalanced-forces-video-for-kids/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students will answer pre-assessment questions aloud with a teacher.
Explore: Predictions will be recorded using sentence starters, word banks or circling choices.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students will explain the forces by labeling them using pictures from the activity.

Tier III:
Engage: Students will answer pre-assessment questions aloud with a teacher.
Explore: Predictions will be recorded using sentence starters, word banks or circling choices.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students will explain the forces by labeling them using pictures from the activity.

Day 11, 12, 13: Generation Genius - Collisions & Rube Goldberg Project
Objective: I can identify that energy is the ability to make things happen.

I can explore that moving objects transfer energy when it comes in contact with another object.
I can demonstrate how making an object faster or heavier results in more energy transfer.
I can explore that in a collision, some energy is converted into sound and heat.
Essential Question: What type of energy causes objects to move?
Materials: Pool Noodles cut in half lengthwise, Marbles, Small sticky note flags, Wet erase markers, Science notebooks, pencils, Books, Two surfaces at different heights, Ruler, Marker, Binder clip, Highlighter, Tape, Cup, Candy, Bowl, Small heavy object

Engage: Class will discuss pre assessment questions to activate prior knowledge. These questions can be answered in science notebooks. Students put hands together and rub back and forth quickly. This shows energy transfer, sound and heat energy. Teacher will show students a video of slow-motion collision in sports.
Explore: Class will create a ramp using a pool noodle. Students will predict and create a chart on what will happen when both marbles are released at the middle of the ramp. Class will discuss results. Class will make predictions for small marble being released at the top of the ramp and collides. Class will discuss. Class will predict what they think will happen if a large marble is released in the middle of the ramp and collides. Class will conduct the experiment.
Explain: Class will watch Generation Genius Collisions video and discuss using discussion questions.
Elaborate: Class will create their own Rube Goldberg machine using collision.
Evaluate: Students will sketch a model of their machine labeling their drawing to show how each collision plays a part in the transfer of energy.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/collisions-video-for-kids/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
EEngage: Students will answer pre-assessment questions aloud with a teacher.
Explore: No modifications- students will participate in experiment as a class.
Explain: No modifications.
Elaborate: Students will complete this in partners with teacher support when needed.
Evaluate: Students will look at a picture and verbally explain how collision and energy are related.

Tier III:
Engage: Students will answer pre-assessment questions aloud with a teacher.
Explore: No modifications- students will participate in experiment as a class.
Explain: No modifications.
Elaborate: Students will complete this in partners with teacher support when needed.
Evaluate: Students will look at a picture and verbally explain how collision and energy are related.

Day 13 & 14: Mystery Science: Collisions & Energy Transfer (Bumper Coasters Part 1)
Objective: I can explore how energy can be stored as height
Essential Question: What makes roller coasters go so fast?
Materials: Alligator Printout, Bumper Coaster Part 1 Tracks, Collision Experiments, Distance & Height Experimesnts, Box Pencil, Rulers, Scissors, File Folder Labels, Paper Clips, Small Marbles
Engage: Students will answer the question: What makes roller coasters go so fast? In their science notebooks. Class will discuss.
Explore: Students will pick their favorite roller coaster and watch a virtual video of the roller coaster. Students will elaborate on their original discussion question.
Explain: Teacher will explain how energy can be stored as height while discussing the findings of the Mystery Science video.
Elaborate: Students build paper roller coasters (Day 13). Students release marbles down paper roller coaster track to understand height energy and energy transfer. Students will record results. (Day 14)
Evaluate: Class will discuss their findings and record their understanding of energy transfer. (Day 14)

Link to Lesson Activity: https://mysteryscience.com/energy/mystery-2/collisions-energy-transfer/380

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: Students will answer questions aloud with a teacher in a small group discussion.
Explore: Students will elaborate verbally with a teacher after watching the video.
Explain: Students will be pre-taught the vocabulary from the video.
Elaborate: Students will be given teacher support when necessary.
Evaluate: Students will watch the video on the ferris wheel and compare that energy to the roller coaster in a small group discussion.

Tier III:

Engage: Students will answer questions aloud with a teacher in a small group discussion.
Explore: Students will elaborate verbally with a teacher after watching the video.
Explain: Students will be pre-taught the vocabulary from the video.
Elaborate: Students will be given teacher support when necessary.
Evaluate: Students will watch the video on the ferris wheel and compare that energy to the roller coaster in a small group discussion.

Day 15 & 16: Mystery Science: Energy Transfer & Engineering (Bumper Coasters Part 2)

Objective: I can explore how energy can be stored as height.
Essential Question: Why is the first hill of a roller coaster always the highest?

Materials: Bumper Coaster Hill Tracks printout, Bumper Coaster with Hills worksheet, Low Hills, Medium Hills, and Hill Holder printout, Box, Bumper Coaster Tracks and Alligator from Energizing Everything Lesson 2, Pencil, Rulers, Scissors, File Folder Stickers, Paper Clips, Small Marbles

Engage: Students will answer the question: Why is the first hill of a roller coaster always the highest? In their science notebooks. Class will discuss.
Explore: Class will watch a video of a roller coaster that has the first hill as the highest and discuss their findings.
Explain: Class will watch Mystery Science video for explanation and lesson directions.
Elaborate: Students add hills to the bumper coaster they made on Day 13 & 14 on Day 15. This will deepen their understanding of hills and energy. Students will record their results.
Evaluate: Students will share their bumper coasters and findings with the class. (Day 16)

Link to Lesson Activity: https://mysteryscience.com/energy/mystery-3/energy-transfer-engineering/381

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students will answer questions aloud with a teacher in a small group discussion.
Explore: No modifications- students will watch the video and discuss with the class.
Explain: Students will have directions further explained to them in small group with an example of what they need to do.
Elaborate: Students will be given a checklist of what they need to do.
Evaluate: No modifications.

Tier III:
Engage: Students will answer questions aloud with a teacher in a small group discussion.
Explore: No modifications- students will watch the video and discuss with the class.
Explain: Students will have directions further explained to them in small group with an example of what they need to do.
Elaborate: Students will be given a checklist of what they need to do.
Evaluate: No modifications.

Day 17: Nearpod: Understanding Electrical Fields
Objective: I can explore what causes static electricity.
I can describe how charged particles interact with each other.
I can describe how electrical energy is transformed into other types of energy such as sound, light, and heat.
I can differentiate between conductors and insulators.
Essential Question: What is electricity?
Material: Science notebooks, pencil, Chromebook

Engage: Class will assess prior knowledge using poll. Then, they will discuss the question: How does electrical energy exert a force on other objects?
Explore: Class will watch a video of a thunderstorm and observe how the lightening is a form of electrical energy.
Class will discuss what they think causes lightning.
Explain: Teacher will explain electrical energy and introduce vocab. Class will practice matching vocab words with their meaning.
Elaborate: Class will watch a video on static electricity. They will answer the question: Explain why a balloon is able to stick to the wall after it is rubbed with a wool cloth, in their science notebooks. Class will discuss transformation and watch another video on electricity.
Class will answer the question, "Describe how energy is transformed when a lamp is plugged into an outlet and turned on."
Class will then learn about conductors and insulators. They will watch a video on conductors vs. insulators and play a game.
Evaluate: Students will complete a quiz to show their understanding of the concepts learned in the lesson. Students will reflect upon their learning using a class poll.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=a8e8668f20ec233990d9afce988b5eb2-1

https://www.brainpop.com/science/energy/electricity/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modifications.
Explore: No modifications.
Explain: Students will be pre-taught vocabulary words.
Elaborate: Students will have the opportunity to answer Nearpod questions using pictures, one word answers, text to speech or answer verbally.
Evaluate: No modifications.

Tier III:
Engage: No modifications.
Explore: No modifications.
Explain: Students will be pre-taught vocabulary words.
Elaborate: Students will have the opportunity to answer Nearpod questions using pictures, one word answers, text to speech or answer verbally.
Evaluate: Quiz will be read aloud to students with this modification.

Day 18 & 19: Energy Project & Assessment
Objective: I can apply my knowledge of energy to create a models.

I can explore various forms of energy in the world and classify them based on my understanding of the concepts taught throughout the unit.
Essential Question: What forms of energy can I find in my every day life?
Materials: Science notebooks, pencils, DIY Robot Page, Lifesavers, Straws, Paper Masking Tape, Energy Walk Worksheet

Engage: Many inventions transfer energy from one form to another. For example, toasters use electric energy to create thermal energy which toasts bread. Roller coasters transfer potential energy into kinetic energy. Brainstorm well-known inventions that involve a transfer of energy. List five of these inventions, and then explain the energy transfer that takes place because of this invention.

Explore: DIY Robot The robot designed must produce at least three forms of energy discussed in the unit. The students must circle the forms of energy their robot produces and explain the specific feature of the robot for each form of energy circled. Students will draw the robot and write a paragraph describing their robot. Students will be graded according to rubric.

Explain: Students will share their robots with the class. Students will comment and ask questions about each robot.

Elaborate: Transfer of Energy Project
Build a puff-mobile using the materials provided - lifesavers, straws, paper, masking tape. The puff-mobile moves from the force of your breath. To create the wheels, use straws and lifesavers. Then, use paper to make a sail that your breath can blow against. Test your puff mobile to make sure it travels well. Then, create a transfer of energy with your puff-mobile.

Evaluate: Energy Walk - Students will go outside and record 10 different forms of energy that they see in objects they observe. They will classify the energy observed and share with the class.

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate

- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modifications.
Explore: Students will be given word bank and sentence starters to fill out the DIY Robot page.
Explain: No modifications.
Elaborate: Students will be given a checklist of what to do for the project. Teacher assistance will be provided when necessary.
Evaluate: Students will be given a word bank of each form of energy with a brief description of each.

Tier III:
Engage: Brainstorming will happen in small group with a teacher.
Explore: Students will be given word bank and sentence starters to fill out the DIY Robot page.
Explain: No modifications.
Elaborate: Students will be given a checklist of what to do for the project. Teacher assistance will be provided when necessary.
Evaluate: Students will be given a word bank of each form of energy with a brief description of each.

Unit Assessments: Rube Goldberg Project, Roller Coaster Project, Energy Robot Project

Formative: Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals

Summative: Lab Sheets, Lab Activities, Creating Diagrams, Science Notebook Journaling

Science Unit 2: Waves & Applications
Grade 4

Unit Title	Waves & Applications
Recommended Pacing	14 Days
Unit Summary	In this unit of study, students use a model of waves to describe patterns of waves in terms of amplitude and wavelength and to show that waves can cause objects to move. The crosscutting concepts of patterns; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, and constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate their understanding of the core ideas.
Career Readiness, Life Literacies, and Key Skills Standards	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7) ● Curiosity and willingness to try new ideas (intellectual risktaking) contributes to the development of creativity and innovation. ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. ● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

	● 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. ● 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
Computer Science and Design Thinking (Technology)	● The technology developed for the human designed world can have unintended consequences for the environment. ● 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ● 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ● 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ● 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Diversity, Equity, and Inclusion	● Videos featured individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● Core Idea 1: Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways. Some resources are renewable over time and others are not. ● Performance Standard 1: 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

	● Core Idea 2: Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. ● Performance Standard 2: 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost. ● Core Idea 3: Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. ● Core Idea 3: Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. ● Performance Standard 3: 3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Supplemental Class Resources	- Generation Genius - Nearpod - Mystery Science - BrainPop - iXL - Compare Amplitudes and Wavelengths of Waves

Disciplinary Core Idea	Performance Expectation
PS4.A: Wave Properties ● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the	● Design a bullhorn to show sound waves. ● Design telephones to show tranfser of vibrations to create sound. ● Interpret how sound is created using containers of water ● Develop a wave model collaboratively. ● Identify sound energy vocabulary.

water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (4-PS4-1) ● Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **PS4.B: Electromagnetic Radiation** ● An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) **PS4.C: Information Technologies and Instrumentation** ● Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) **ETS1.C: Optimizing the Design Solution** ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)	● Devise a bottle chart of different pitches to play a song. ● Relate pitch to amount of water in a glass. ● Ivent musical instrument to discuss transfer of energy through sound waves. ● Demonstrate vibrations through modeling. ● Explain low and high pitch sounds and their wavelengths. ● Identify light energy vocabulary. ● Label a diagram that shows how our eyes see reflection in the mirror. ● Conclude how light absorbed through dark and light experiment. ● Identify and label three types of manmade light and three different types of natural light. ● Illustrate what objects light can pass through and categorize them as opaque, translucent or transparent.

Science & Engineering Practices	Developing and Using Models Connections to Nature of Science Scientific Knowledge is Based on Empiracal Evidence
Articulation of DCI's Across Grade-Levels	● K.ETS1.A (4-PS4-3) ● 1.PS4.B (4-PS4-2)

	● 1.PS4.C (4-PS4-3) ● 2.ETS1.B (4-PS4-3) ● 2.ETS1.C (4-PS4-3) ● 3.PS2.A (4-PS4-3) ● MS.PS4.A (4-PS4-1) ● MS.PS4.B (4-PS4-2) ● MS.PS4.C (4-PS4-3) ● MS.LS1.D (4-PS4-2) ● MS.ETS1.B (4-PS4-3)
Crosscutting Concepts	**Patterns** Similarities and differences in patterns can be used to sort and classify natural phenomena. (4-PS4-1) Similarities and differences in patterns can be used to sort and classify designed products. (4- PS4-3) **Cause and Effect** Cause and effect relationships are routinely identified. (4-PS4-2) **Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology** Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4- 3)

Math Student Learning Objectives Covered in this Unit
● MP.4 Model with mathematics. (4-PS4-1), (4-PS4-2) ● 4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1), (4-PS4-2)

ELA Student Learning Objectives Covered in this Unit

- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS4-3)
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3)
- SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1), (4-PS4-2)

Modifications

Unit 2 Modifications:

Gifted and Talented:
- Student choice for projects
- Access to higher level texts/ articles
- Research opportunities as an extension of content being taught
- Strategic small groups based on Reading level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:
- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on Reading levels
- Differentiated project options and assessments

At Risk Students/504 Plans:
- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals

- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:
https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit Two: Waves and Adaptations	
NJ Student Learning Standards: Science Grade 4	**Length: 14**

4-PS4-1 - Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. **4-PS4-2** - Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. **4-PS4-3** - Generate and compare multiple solutions that use patterns to transfer information.	**NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Information, Media and Technology Skills** Information Literacy Media Literacy ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions:

- How is sound created?
- How does energy travel through transverse and longitudinal waves?
- How do musical instruments work to produce sound?
- How do stringed instruments make sound?
- What would happen if you screamed in outer space?
- Why are some sounds high and some sounds low?
- What is the science behind light and reflections?
- What objects will light travel through?

Learning Goals:

- I can explore and experiment with sound waves.
- I can explore how waves cause energy to move from place to place.
- I can define amplitude and wavelength.
- I can explore how we hear different sounds.
- I can identify that pitch is determined by the armound of air in a bottle.
- I can investigate and explain that sound is produced by vibration or resonation and that pitch depends on the speed of that vibration.
- I can explore and create a stringed instrument to show my understanding of sound waves and how energy is transferred.
- I can explore the properties of sound and vibration.
- I can identify the wavelengths of high and low pitch sounds.
- I can identify that light travels in a straight line and reflects off things.
- I can explore that we see light because it reflects off objects and enters our eyes.
- I can explain how our eyes do not produce light, they only detect it.
- I can explore various sources of light.
- I can identify objects that are opaque, transparent and translucent.
- I can create and conduct an experiment based on my understanding of light energy.

NJSLS Lessons:
Day 1: Soundwaves Objective: I can explore and experiment with sound waves. Essential Question: How is sound created? Materials: Paper, Pencil, Plastic Cups, String, paper Clip, Science Notebooks Engage: Walk across the room and say something using a normal voice. Can the people in your group figure out what you said? Explore: Create a bullhorn using paper. How does a bullhorn help you speak across the room. Roll it into a cone shape. Go across the room and say something to your group. Does it make your voice louder? Why? Explore which shape of the bullhorn will help to make your voice the loudest. Explain: Explore and discuss sound waves through https://www.brainpop.com/science/energy/waves/ https://www.youtube.com/watch?v=ACeUO4ufx2I Elaborate: Sound Waves - Students use a pen to make a hole in the middle of the bottom of two plastic cups. They will tie a paper clip to one end of the string. They will pass the other end of the string through the hole from the inside of the cup. They will move the clip to the end of the string until it is next to the paper clip. Take the loose end of the string and pass it through the hole on the second cup from the outside of the cup. Tie the second paper clip to the end of the string from the inside of the second cup. Then, two members from the group take a cup. Make the string straight. One person should speak into their cup while the other listens to their cup. Evaluate: Discuss and record - What happens? What do you hear? What do you feel? Students will reflect upon the activity and determine why this device will not work if the string is not pulled tight across the two people. **Differentiation:** **General Accommodations/Modifications:** ● Extended time for assignments ● Alternative forms of assessment if appropriate

- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modifications.
Explore: No modifications.
Explain: https://jr.brainpop.com/science/energy/sound/
Elaborate: No modifications.
Evaluate: Students will have sentence starters and a word bank in order to record what they experience. Students will also have the ability to discuss with a teacher their experience or draw about it for their reflection.

Tier III:
Engage: No modifications.
Explore: No modifications.
Explain: https://jr.brainpop.com/science/energy/sound/
Elaborate: No modifications.
Evaluate: Students will have sentence starters and a word bank in order to record what they experience. Students will also have the ability to discuss with a teacher their experience or draw about it for their reflection.

Day 2 & 3: Generation Genius - Wave Properties
Objective: I can explore how waves cause energy to move from place to place.
I can define amplitude and wavelength.
I can explore how we hear different sounds.
Essential Question: How does energy travel through transverse an dlongitudinal waves?
Materials: Science Notebooks, Pencils, Transparent Contrainers, Water, Towels skewers, Duct Tape

Engage: Students will write the word “waves” in their science notebook. Teacher will give students 5 minutes to write down what they think about when they hear that word. Class will discuss. Teacher will show a video of waves in open water or make waves inside a container filled with water. Class will discuss what is happening.
Explore: Students explore waves using containers of water focusing on discussion questions. Complete activity outdoors if possible!
Explain: Debunk misconceptions about waves. Class will create a model to understand how waves are formed. Class will do the wave as they represent water. Class will discuss what is happening. Use discussion questions for guidance.
Class will watch Generation Genius Wave Properties video to expand understanding and introduce longitudinal waves.
Elaborate: Students will work in small groups to make a wave model. Some students may engage in the challenge of making a model with longitudinal waves. (Day 3)
Evaluate: Class will label different types of waves and determine which is water waves and which is sound waves.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/wave-properties-video-for-kids/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modifications.
Explore: Discussion questions answered verbally or with the use of word bank and sentence starters.
Explain: Discussion questions answered verbally or with the use of word bank and sentence starters.
Elaborate: Teacher assistance when needed.
Evaluate: No modifications.

Tier III:

Engage: Students will discuss with a teacher in a small group about what they think of when they hear “waves” prior to the class discussion.
Explore: Discussion questions answered verbally or with the use of word bank and sentence starters.
Explain: Discussion questions answered verbally or with the use of word bank and sentence starters.
Elaborate: Directions repeated on creating the model, teacher assistance when needed.
Evaluate: Students will label water and sound waves in a small group with a teacher.

Day 4 & 5: Nearpod: The Science of Sound
Objective: I can identify that pitch is determined by the amount of air in a bottle.
I can investigate and explain that sound is produced by vibration or resonation and that pitch depends on the speed of that vibration.
Essential Question: How do musical instruments work to produce sound?
How can we observe this through bottle blowing?
Materials:

Engage: Vocabulary guessing of the words pitch, vibrate, resonate. Students will be given pictures and they will use the picture to identify the definition. Class will review definition. Class will work together to use vocabulary words to fill in the blank.
Explore: On nearpod, students will answer the question: Have you ever blown across a bottle’s top and made a pleasant, resonant sound? How do you think that sound is made? Class will discuss
Explain: Think-Pair-Share - How do you think sound is produced? Give examples.
Class will discuss how sound works.
Elaborate: Students will pick their favorite instrument and try to explain how it works using the vocabulary and information learned in the lesson.
Class will watch a video of bottle blowing musicians. Class will focus on pitch and write about it.
Class will read how different types of instruments work.
Students will create a bottle-chart showing how to play twinkle twinkle little star. Students will work in groups to complete the activity (Day 5)
Evaluate: Students will label bottles with pitches they expect to hear based on what they learned.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=ef525f85f58b1d296d7797714f72137a-1

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: Vocabulary words will be pre taught.

Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.

Explain: No modifications.

Elaborate: Teacher assistance when needed.

Evaluate: Teacher assistance when needed.

Tier III:

Engage: Vocabulary words will be pre taught.

Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.

Explain: No modifications.

Elaborate: Completed in a small group with teacher assistance.

Evaluate: Completed in a small group with teacher assistance.

Day 6 & 7: Pitch

Objective: I can explore and create a stringed instrument to show my understanding of sound waves and how energy is transferred.

Essential Question: How do stringed instruments make sound?

Materials: Science Notebook, Pencil, Rubber Band, Glasses, Water, Straws, Metal Spoon, Cardboard, Foil, Wax Paper

Engage: The class will listen to a variety of different sounds that vary in pitch. They will try to describe the sounds they hear and discuss how particular pitches can be made.

Explore: Loop a rubber band around your fingers. Pluck the rubber band. What kind of sound do you hear when you stretch a rubber band very right? Now loosen the rubber band so it is barely stretch across your fingers. How does the sound change when you don't stretch it as far.

Explain: Fill three glasses with different levels of water. Tap on the glasses. Do you hear a change in pitch? What do you notice about the water levels in each glass? Does the amount of water have any effect on the pitch?

Students will order the glasses from lowest pitch to highest pitch. They will test to be sure they have arranged them correctly. Then, the teacher will ask, "What will happen if we used a larger container?". Students will use the information learned from the experiment to make a prediction and that class will test their ideas as a whole.

The class will discuss how certain pitches can be made which will lead into the question: "How do musical instruments that use strings make different pitches?"

Elaborate: Design a Musical Instrument - Straws, Rubber Bands, Glass, Metal Spoon, Cardboard, Foil, Wax Paper (This activity can be found at the end of the Nearpod Lesson from Day 4&5)

Cut straws so that you have three different sizes. Blow into each straw. Do you hear a change in pitch as you change sizes?

Now, design a musical instrument that changes pitch in some way. Create the instrument and be ready to demonstrate it!

Evaluate: Students will demonstrate their musical instruments and reflect upon how they created the different pitches. They will determine how to improve their instruments. Finally, they will discuss the transfer of energy caused by their instruments.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: No modifications.

Explore: When completing reflection, students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Explain: When completing reflection, students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Elaborate: Teacher assistance when necessary.

Evaluate: No modifications.

Tier III:

Engage: No modifications.

Explore: When completing reflection, students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Explain: When completing reflection, students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Elaborate: Teacher assistance when necessary.

Evaluate: No modifications.

Day 8 & 9: Mystery Science: Sound & Vibrations

Objective: I can explore the properties sound and vibration.

Essential Question: What would happen if you screamed in outer space?
Materials: Sound Blobs Printout, Scotch Tape, Balloons, Small Binder Clips

Engage: Students will answer the question: What would happen if you screamed in outer space? In their science notebooks. Class will share their thoughts. Class will watch intro video of child talking other water and a construction device underwater.

Explore: Class will discuss how they would find out if there are vibrations in the air when we talk to each other.
Class will complete first activity with balloon as a sound detector. Class will discuss.

Explain: Then, students will become a car speaker and car windshield. Other people will be air blobs. Speaker will be separated by air blobs from the windshield. Students will follow directions in the video for discussion.

Elaborate: Students will watch Mystery Science Video explaining what happened with sound and vibration.

Evaluate: Students will complete exit ticket answering the the essential question.

Link to Lesson Activity: https://mysteryscience.com/waves/mystery-2/sound-vibrations/51

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:

Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Teacher assistance when necessary.
Explain: Directions repeated.
Elaborate: No modifications.
Evaluate: Students may answer exit ticket verbally.

Tier III:
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Teacher assistance when necessary.
Explain: Directions repeated.
Elaborate: No modifications.
Evaluate: Students may answer exit ticket verbally.

Day 10 & 11: Mystery Science: Sound Waves & Wavelength
Objective: I can identify the wavelengths of high and low pitch sounds.
Essential Question: Why are some sounds high and some sounds low?
Materials: Be the Vibration Worksheet, Sound Vibrartions Worksheet, Clothesline or Jumprope, Science Notebook, Pencil

Engage: Class will watch intro video in Mystery Science Lesson. Then, students will answer the question: What do you think-what makes one sound LOWER and another sound HIGHER in their science notebooks. Class will discuss.

Explore: Class will watch Mystery Science video that will introduce them to science concepts and vocabulary on sound waves and wavelength. Class will discuss differences that are seen between vibrarations that creates a high pitch and a low pitch. Class will answer this question on the worksheet.

Explain: Class will watch video on discussion question and look at the wavelengths of high and low pitch sounds. Students will be able to identify the different wavelengths.

Elaborate: Students will complete Mystery Science Activity.

Evaluate: Students will record their results on their experiment worksheet.

Link to Lesson Activity: https://mysteryscience.com/waves/mystery-3/sound-waves-wavelength/52

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: When recording their results, students have the opportunity to answer verbally or using sentence starters and a word bank.

Tier III:
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Students will have the opportunity to answer verbally or using sentence starters and a word bank.

Explain: No modifications.
Elaborate: No modifications.
Evaluate: When recording their results, students have the opportunity to answer verbally or using sentence starters and a word bank.

Day 12: Generation Genius - Light Reflection & Vision
Objective: I can identify that light travels in a straight line and reflects off things.
I can explore that we see light because it reflects off objects and enters our eyes.
I can explain how our eyes do not produce light, they only detect it.
Essential Question: What is the science behind light and reflections?
Materials: Window or source of light, construction paper, paper, plastic, glass, solid objects, mirrors, cheap laser pointer, large box, clear plastic, tape, phone or tablet.

Engage: Class will discuss pre-assessment questions to activate prior knowledge. Class will look in mirror. Students will discuss what they see.
Explore: Students will demonstrate how objects affect light. Students will learn vocabulary of transparent, translucent, and opaque.
Elaborate: Class will watch the Generation Genius Light Reflection video and discuss questions.
Elaborate: Students will complete a project on how light and reflections can cause a hologram phenomena to work.
Evaluate: In science notebooks, students draw a diagram that shows how our eyes see reflection in the mirror. Class will share their responses.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/light-reflection-and-vision-video-for-kids/
https://www.brainpop.com/science/energy/light/
https://jr.brainpop.com/science/energy/light/

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary

- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modification.
Explore: Students will have been pre-taught the new vocabulary words.
Explain: No modification.
Elaborate: Students will be walked through step by step or what they need to do to complete the project.
Evaluate: Students will verbally explain how reflection works using a diagram drawn for them.

Tier III:
Engage: No modification.
Explore: Students will have been pre-taught the new vocabulary words. Students will watch the Brain Pop Jr. video in small group and discuss what they've learned.
Explain: No modification.
Elaborate: Students will be walked through step by step or what they need to do to complete the project.
Evaluate: Students will verbally explain how reflection works using a diagram drawn for them.

Day 13 & 14: Light Energy Experiment
Objective: I can explore various sources of light.
I can identify objects that are opaque, transparent and translucent.
I can create and conduct an experiment based on my understanding of light energy.
Essential Question: What objects will the light travel through?
Materials: Science Notebook, Pencil, Mason Jar, Construction Paper (Black & White), Water, Flashlight, Toilet Paper Tube, Aluminum Foil, Plastic Bag, Paper Bag, Felt, Plastic Cup, Tracing Paper, Lab Worksheet

Engage: Brainstorm as many different sources of light that you can! Class will create a list. Class will discuss importance of light. Students will have the opportunity to explore various objects and predict whether or not light will pass through it based on the characteristics of the objects.

Explore: Teacher will wrap two identical mason jars with construction paper - 1 with black and 1 with white. The same amount of water will be poured into each and taped closed. Students will predict which jar the water will become warmer. Jars will be left in the sun for at least two hours before measuring the temperature in each. Students will record results.

Explain: Dark surfaces such as black paper absorb more light and heat than the lighter ones such as the white paper. After measuring the temperatures of water, the glass with the black paper around it should be hotter than the other. Lighter surfaces reflect more light, that's why people wear lighter colored clothes in the summer, it keeps them cooler. https://www.brainpop.com/science/energy/light/

Elaborate: Draw and label three different types of manmade light and three different types of natural light.

Students will determine what light can pass through. They will use a flashlight, a toilet paper tube and various objects to determine if the object is opaque, translucent or transparent. The objects include aluminum foil, plastic bag, paper bag, felt, plastic cup and tracing paper. Students will make predictions before the experiment and explain their reasoning based on their observations after the experiment.

Evaluate: What objects will the light travel through? (Opaque, Translucent, and Transparent) Design a lab investigating how light travels. Using a flashlight, light bulb, or any other light source. Students will elaborate on their lab to explain opaque, translucent, and transparent. Students will evaluate their lab through peer evaluation. Students will go around trying other groups' labs. Teachers will also circulate and evaluate the lab they designed.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary

- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II:
Engage: No modifications.
Explore: Students will verbally predict what will happen.
Explain: No modifications.
Elaborate: Label pictures of different types of manmade and natural light.
Evaluate: Students will be given a checklist of what they need to accomplish. Teacher assistance will be provided when needed.

Tier III:
Engage: No modifications.
Explore: Students will verbally predict what will happen.
Explain: No modifications.
Elaborate: Label pictures of different types of manmade and natural light.
Evaluate: Students will be given a checklist of what they need to accomplish. Teacher assistance will be provided when needed.

Unit Assessments: Creation of Light Experiment, High & Low Pitch Wavelengths Assessment

Formative: Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals

Summative: Lab Sheets, Lab Activities, Creating Diagrams, Science Notbeook Journaling

Science Unit 3: Molecules to Organisms
Grade 4

Unit Title	Molecules to Organisms
Recommended Pacing	20 Days
Unit Summary	In this unit of study, students spend time observing plants and animals in order to gather evidence that organisms are living systems. A system is made up of structures and processes that interact and enable the system to function. Every plant and animal can be described in terms of its internal and external structures and their interactions, and these structures each have specific functions that support survival, growth, behavior, and reproduction for the organism.
Career Readiness, Life Literacies, and Key Skills Standards	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7) ● Curiosity and willingness to try new ideas (intellectual risktaking) contributes to the development of creativity and innovation. ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. ● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

	● 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. ● 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
Computer Science and Design Thinking (Technology)	● The technology developed for the human designed world can have unintended consequences for the environment. ● 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ● 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ● 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ● 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Diversity, Equity, and Inclusion	● Videos included feature individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● Populations live in a variety of habitats and change in those habitats affects the organisms living there. ● The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as

	"decomposers." ● Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

Supplemental Class Resources	- Generation Genius
	- Nearpod
	- Mystery Science
	- BrainPop
	- Unit 3
	- iXL
	  - Identify mammals, birds, fish, reptiles, and amphibians
	  - Use evidence to classify mammals, birds, fish, reptiles, and amphibians
	  - Read and construct animal life cycle diagrams
	  - Compare animal life cycles
	  - Identify plant parts and their functions
	  - Identify flower parts and their functions
	  - Describe and construct flowering plant life cycles
	  - Introduction to adaptations
	  - Animal Adaptations: beaks, mouths, and necks
	  - Animal Adapatations: feet & limbs
	  - Animal Adaptations: Skin & Body Coverings
	- Reading Wonders
	  - Unit 2 Week 6
	  - Everglades Mammals
	  - Nine-Banded Armadillos

	- Sharks (Time for Kids) - Extreme Animals - Energy in the Ecosystem - Unit 4 Week 6 - Flowering & Nonflowering Plants

Disciplinary Core Idea	Performance Expectation
● LS1.A: Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) ● LS1.D: Information Processing Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	● Extract prior knowledge about humans adapting to their environment. ● Identify behavioral and structural adaptations of animals. ● Anaylze animal's behavioral and structural adaptations through observation of live webcams. ● Classify reptiles based on their physical characteristics. ● Illustrate the life cycle of a reptile. ● Discover habitats of reptiles and identify how they adapt to their environment. ● Explain an adaptation of a reptile based on research. ● Classify fish based on their physical characteristics. ● Illustrate the life cycle of a fish. ● Discover habitats of fish and identify how they adapt to their environment. ● Explain an adaptation of a fish based on research. ● Classify amphibians based on their physical characteristics. ● Illustrate the life cycle of an amphibian.

	● Discover habitats of amphibians and identify how they adapt to their environment. ● Explain an adaptation of an amphibian based on research. ● Classify mammals based on their physical characteristics. ● Illustrate the life cycle of a mamal. ● Discover habitats of mammals and identify how they adapt to their environment. ● Explain an adaptation of an mammal based on research. ● Infer how plants adapt to seasonal changes in their environment. ● Analyze various environments plants live in to discover how they adapt to their environment. ● Identify physical characterisitics of a plant that help it to adapt. ● Compare animal and plant life cycles. ● Interpret how living and non-living things interact within an ecosystem. ● Create a terrarium to observe ecosystem. ● Connect living and nonliving things within a food chain to a food web. ● Anaylze how taking away pieces of the food web impact life of living things. ● Describe how giraffes get their energy through exploring African Safari. ● Identify vocabulary related to food webs and food chains. ● Discover what plants and animals need to survive through time lapse video. ● Conclude how plants and animals depend on one another to survive. ● Explain the difference between herbivores and carnivores.

	● Collaborate to identify how different bird's physical adaptations help them to survive in their environment. ● Articulate how animals become extinct through video, demonstration, and explanation. ● Infer how individual traits of plants and animals help to classify them. ● Research, observe, and analyze plant and animal physical and behavioral adaptations to present to the class.

Science & Engineering Practices	**Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Construct an argument with evidence, data, and/or a model. (4- LS1-1)
Articulation of DCI's Across Grade-Levels	● 1.LS1.A (4-LS1-1) ● 1.LS1.D (4-LS1-2) ● 3.LS3.B (4-LS1-1) ● MS.LS1.A (4-LS1-1), (4-LS1-2) ● MS.LS1.D (4-LS1-2)
Crosscutting Concepts	**Systems and System Models** A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)

Math Student Learning Objectives Covered in this Unit
● 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)

ELA Student Learning Objectives Covered in this Unit
● W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4- LS1-1) ● SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2)

Modifications
Unit 3 Modifications: Gifted and Talented: ● Student choice for projects ● Access to higher level texts/ articles ● Research opportunities as an extension of content being taught ● Strategic small groups based on Reading level ● Individual project opportunities ● Critical thinking questions ● At home project suggestions Special Education: ● Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals ● Students will be provided with modified graphic organizers ● Modifications will be followed as stated in IEP ● Students will be provided small group instruction to ensure understanding of concepts

- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on Reading levels
- Differentiated project options and assessments

At Risk Students/504 Plans:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:
https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit Three: Molecules to Organisms	
NJ Student Learning Standards: Science Grade 4 ● **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. ● **4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	**Length:** 20 Days **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Information, Media and Technology Skills** Information Literacy Media Literacy

	ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions:

- What is an adaptation?
- What is the difference between a behavioral and structural adaptation?
- How can you classify an animal as a reptile?
- How can you classify an animal as a fish?
- How can you classify an animal as an amphibian?
- How can you classify an animal as a mammal?
- How are plants adapted to seasonal change?
- How are plant and animal life cycles similar and different?
- How do living and non-living things interact in an ecosystem?
- How are food chains connected to one another?
- How is energy transferred in a food web?
- How is the sun's energy used by organisms in an environment?
- How do herbivores obtain energy?
- How do carnivores obtain energy?
- How do animals adapt to get the food they need to survive?

- How do animals become extinct?
- How are traits developed among the same group of species?
- How do animals of the same species interact with one another?

Learning Goals:

- I can identify the difference between behavioral and structural adaptations.
- I can observe animals in their environment and identify how they adapt in their environment.
- I can use physical traits to describe and classify reptiles.
- I can explain how reptiles use adaptations to survive.
- I can describe the life cycle of reptiles.
  I can explain how adaptations help the chameleon survive.
- I can use physical traits to describe and classify fish.
- I can explain how fish use adaptations to survive.
- I can describe the life cycle of fish.
- I can explain how anglerfish survives in extreme environments.
- I can describe the physical traits of amphibians and classify them based on physical traits.
- I can explain how amphibians change during their life cycle.
- I can describe how amphibians use coloration to survive.
- I can use physical traits to describe and classify mammals.
- I can describe the life cycle of mammals.
- I can distinguish between marsupials, monotremes, and placentals.
- I can demonstrate an understanding of how plants are adapted to seasonal changes.
- I can apply scientific vocabulary to explain how plants are adapted to survive winter.
- I can explore how plants and animals are born, grow, change, reproduce and die over time.
- I can identify the stages of life cycles of different plants and animals.
- I can identify that an ecosystem is a community of interacting organisms & their environment.
- I can explore the needs that need to be met in specific ecosystems.

- I can research how newly introduced organisms can throw off the balance in an ecosystem.
- I can explore interactions between organisms and their environment.
- I can research food chains and how they interact to form webs.
- I can explore the roles of different plants, animals, and other organisms in a population.
- I can explain how energy is transferred within a food web.
- I can explain the role of producers, consumers, and decomposers.
- I can describe the impact of removing or adding species to an exosystem on the food web in that area.
- I can recognize that living things interact and depend on each other and their environment to meet their basic needs.
- I can explain that producers make their own food using the process of photosynthesis.
- I can describe the flow of energy through the food web, including the sun, producers, consumers, and decomposers.
- I can explain interdependence of plants and animals in an ecosystem.
- I can recognize that food is a source of energy living things need to grow and survive.
- I can describe how herbivores obtain energy by eating plants.
- I can explain how herbivores use behaviors and adaptations to obtain food.
- I can use a model to describe how energy flows in a food chain.
- I can describe how herbivores balance the ecosystem by spreading seeds.
- I can recognize that food is a source of energy that living things need to grow and survive.
- I can describe how carnivores obtain energy by eating other animals.
- I can explain how carnivores use behaviors and adaptations to obtain food.
- I can use a model to describe how energy flows in a food chain.
- I can describe the impact of removing carnivore species from a food chain.
- I can explore how animals adapt to get the food they need to survive.
- I can explore why animals become extinct.
- I can observe related species and determine their similarities and differences.
- I can explore how traits are passed from parents to offspring.
- I can anaylze how some traits are caused by the environment.
- I can observe animals in person and through video to explore their behavior.
- I can use observations as evidence to support scientific arguments about animal groups.

NJSLS Lessons:
Day 1: Introduction to Animal Adaptations Objective: I can identify the difference between behavioral and structural adaptations. I can observe animals in their environment and identify how they adapt in their environment. Essential Question: What is an adaptation? What is the difference between a behavioral and structural adaptation? Materials: Engage: Have students close their eyes and imagine they are camping in the woods. "You are camping with your family. The sun is shining and the wind is blowing your clothes in the wind. You smell the hot dogs cooking on the grill and you suddenly hear thunder coming. The wind picks up, the sky turns dark, and the rain is covering your face. Your food, belongings, and you are about to get soaked. What are you going to do?" Explore: Have students write in their journals what they would do in this situation. Then, discuss what they would have done. Explain to the students that they are adapting to their environment by changing their situation. Explain: What is an adaptation? Students will watch video on BrainPop. Structural Adaptations are characteristics of an animal's body that help it to survive Behavioral Adaptations - Actions animals take in order to survive in their environment. Animal Behavior Elaborate: Students will be broken into pairs or teams to watch a live webcam of a selected animal. Students will observe the animal in their environment and determine how the animal is adapting to their environment in order to survive. Webcams https://nationalzoo.si.edu/webcams http://animals.sandiegozoo.org/live-cams

Evaluate: Students will share their observations with the class and determine which of the adaptations they observed are behavioral or structural.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: Diagram that explains each type of adaptation to use as reference.
Elaborate: Use of reference sheet to determine the adaptations. Students may record their observations through drawings, verbally, or use of sentence starters and word bank.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: Diagram that explains each type of adaptation to use as reference.
Elaborate: Use of reference sheet to determine the adaptations. Students may record their observations through drawings, verbally, or use of sentence starters and word bank.

Evaluate: No modifications.

Day 2: Nearpod Animals: Reptiles
Objective: I can use physical traits to describe and classify reptiles.
I can explain how reptiles use adaptations to survive.
I can describe the life cycle of reptiles.
I can explain how adaptations help the chameleon survive.
Essential Question: How can you classify an animal as a reptile?
Materials: Chromebook

Engage: Class will take a poll on what they already know about reptiles. Class will identify animals that they think are reptiles and share.
Explore: Class will watch a video that shows a variety of reptiles. Students will observe physical characteristics.
Explain: Class will discuss characteristics of reptiles and match their characteristics as a class. Class will review slideshow of different types of reptiles and watch a video.
Elaborate: Class will review life cycle of reptiles and watch a video of a baby alligator hatching from an egg. Students will compare differences between adult and baby reptile.
Evaluate: Students will watch video of chameleon and explain how one adaptation they choose helps it to survive. Then, they will take a short quiz showing what they learned about reptiles.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions

- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students can compare and contrast verbally.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students can compare and contrast verbally.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=cd655b3d4ddefd4995ad5caf07ccd1f5-1

Day 3: Nearpod Animals: Fish
Objective: I can use physical traits to describe and classify fish.
I can explain how fish use adaptations to survive.
I can describe the life cycle of fish.
I can explain how anglerfish survives in extreme environments.

Essential Question: How can you classify an animal as a fish?
Materials: Chromebook

Engage: Class will take a poll on what they know about fish and share their thoughts on Nearpod.
Explore: Class will watch a video on fish to explore their physical traits. Class will discuss.
Explain: Class will explore characteristics of fish and match body parts to their definitions. Class will discuss adaptations of fish. Class will watch a video about fish and the life cycle of fish.
Elaborate: Students will play a game on the life cycle of a fish. Students will label the life cycle of a fish. Class will research characteristics of fish on DK Find Out.
Evaluate: Students will answer the question: How do fins help fish survive? Class will take quiz on Nearpod to show what they learned about fish adaptations throughout the lesson.
Extension: Class will explore Anglerfish through video and write about the unique adaptations Anglerfish have.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Nearpod has pictures and reference link for students to use.
Evaluate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Nearpod has pictures and reference link for students to use.
Evaluate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=b03b53a22a6040dad40b895d187b30c0-1

Day 4: Nearpod Animals: Amphibians
Objective: I can describe the physical traits of amphibians and classify them based on physical traits.
I can explain how amphibians change during their life cycle.
I can describe how amphibians use coloration to survive.
Essential Question: How can you classify an animal as an amphibian?
Materials: Chromebook

Engage: Class will take a poll about what they know about amphibians and share what they know about them.
Explore: Class will watch a video that shows different characteristics of amphibians and record what they saw.
Explain: Class will explore characteristics of amphibians. Students will match their characteristics to their definitions. Class will watch video about amphibians.
Elaborate: Class will explore amphibian habitats and their adaptations within their habitats.
Students will write about the adaptations that help amphibians get food. Class will explore the life cycle of a frog through diagrams and games.
Evaluate: Class will compare the life cycle of a frog vs. a salamander. Class will take a quiz to show what they learned in the lesson.
Extension: Class will explore poison dart frogs. Class will use what they learned to answer how the bright colors of a poison dart frog protects them from predators.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Verbally identify what they saw.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: Verbally identify what they saw.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=c7c7a07289e68a5d21b1a80f399e3c02-1

Day 5: Nearpod Animals: Mammals

Objective: I can use physical traits to describe and classify mammals.
I can describe the life cycle of mammals.
I can distinguish between marsupials, monotremes, and placentals.
Essential Question: How can you classify an animal as a mammal?
Materials: Chromebook

Engage: Class will take a poll to show what they already know about mammals and discuss.
Explore: Class will explore slides and videos of mammals. Students will observe common characteristics of these animals and record their thoughts.
Explain: Class will review characteristics of mammals and play a match game with new vocabulary words. Class will engage in slide show and video about animal characteristics. Then, class will explore the life cycle of mammals through slides and video.
Elaborate: Class will compare a baby horse to an adult horse using characteristics of mammals. Students will explore different types of mammals. Class will compare different types of mammals.
Evaluate: Class will complete quiz about different types and characteristics of mammals.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.

Explain: Pre teach vocabulary.
Elaborate: Students will use word bank to help compare.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: Pre teach vocabulary.
Elaborate: Students will use word bank to help compare.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=bfa4af3e3c86f6bfde5aeeb952587f54-1

Day 6: Nearpod: Adaptations of Plants to Seasonal Changes
Objective: I can demonstrate an understanding of how plants are adapted to seasonal changes.
I can apply scientific vocabulary to explain how plants are adapted to survive winter.
Essential Question: How are plants adapted to seasonal change?
Materials: Chromebook, Science Notebook, Pencil

Engage: Students will write about how plants adapt to seasonal changes on Nearpod. Students will take a poll about plants in the spring and winter.
Explore: Class will virtually visit Maclay Gardens in North Carolina. Class will record observations and discuss.
Explain: Class will watch video about adaptations of plants to seasonal change and note key vocabulary. Class will take a poll following the video.

Elaborate: Students will observe a cactus and work with a partner to determine how it survives seasonal changes. Class will engage in slides about how plants survive seasonal changes. Class will visit winter landscape and analyze.
Evaluate: Students will take a quiz on Nearpod on plant adaptations

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: New vocabulary will be pre taught.
Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Evaluate: No modifications.

Tier III
Engage: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.

Explain: New vocabulary will be pre taught.
Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Evaluate: Quiz will be read aloud to students.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=bf684fcc886c8ed2825e055cf08d58a7-1

Day 7: Generation Genius: Animal & Plant Life Cycle
Objective: I can explore how plants and animals are born, grow, change, reproduce and die over time.
I can identify the stages of life cycles of different plants and animals.
Essential Question: How are plant and animal life cycles similar and different?
Materials: Life Cycle Diagrams, Science Notebooks, Pencils, Markers or Colored Pencils, Internet
DIY Activity Materials: Ripe Avocado, Cutting Board, Knife, Clear Plastic Cup, Toothpicks, Water, Flower Pot, Soil

Engage: Class will watch the Generation Genius Life Cycles Video as a group.
Explore: Class will be divided into groups to explore different life cycles discussed in the video.
They will compare animal life cycles to plant life cycles using a T chart.
Explain: Class will discuss life cycles.
Elaborate: Students will create life cycle models (diagrams) for other animals not in the video based on research.
Evaluate: Teacher will assess life cycle diagrams created.
Extension: Class will grow avocado plants to show the life cycle

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate

- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: When filling out Tchart, students may draw their thoughts, state their thoughts verbally or write them using sentence starters and word bank.
Explain: No modifications.
Elaborate: Teacher assistance as needed.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: When filling out Tchart, students may draw their thoughts, state their thoughts verbally or write them using sentence starters and word bank.
Explain: No modifications.
Elaborate: This will be completed in a small group with the assistance of a teacher.
Evaluate: No modifications.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/animal-and-plant-life-cycles-video-for-kids/

Day 8: Generation Genius: Ecosystems
Objective: I can identify that an ecosystem is a community of interacting organisms & their environment.
I can explore the needs that need to be met in specific ecosystems.
I can research how newly introduced organisms can throw off the balance in an ecosystem.
Essential Question: How do living and non-living things interact in an ecosystem?

Materials: Ecosystem Connection Cards, Science Notebooks, Pencils
DIY Activity: Large glass jar with lid, Mesh, Scissors, Rocks or Gravel, Activated Carbon, Spray b bottle of water, PLants growing in sol, Moss growing in soil, Extra soil, Spoon

Engage: Teacher will display a photo of an animal or plant from an ecosystem where they live. Class will discuss what this animal or plant needs to survive. Class will chart answers and discuss.
Explore: Each student will get an Ecosystem Connection card. Students find students in the room with the same color card to make groups. Students analyze how the cards interact. Students write about the interactions in their science notebooks. Each group will share what they found.
Explain: Class will watch Generation Genius Ecosystems video as a group and discuss.
Elaborate: Class will create a terrarium. Students will observe over the next few weeks to make sure the ecosystem is in balance.
Evaluate: Teacher will provide students with another group of living and nonliving things from an ecosystem. Students will individually list these components interacting in the ecosystem.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students will chart answers alongside of teacher.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: No modifications.

Elaborate: No modifications.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: Students will chart answers alongside of teacher.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/ecosystems-video-for-kids/

Day 9 & 10: Generation Genius: Food Web (2 Days)
Objective: I can explore interactions between organisms and their environment.
I can research food chains and how they interact to form webs.
I can explore the roles of different plants, animals, and other organisms in a population.
Essential Question: How are food chains connected to one another?
Where does our food get its energy?
Materials: Large Yellow Paper, Empty wall, Long strips of colored construction paper (5 per student), Stapler or tape, Yarn Scissors.

Engage: Teacher will create large paper sun that will be posted on a wall. Teacher will ask students what they ate for breakfast. Class will make a list. Teacher will ask: Did anyone eat sunlight for breakfast?". Class will discuss that everyone's food is traced back to the sun.
Explore: Class will return to breakfast list. Teacher will hand out construction paper to create food chain that is modeled in Generation Genius plan. Students will create another chain from another breakfast food. Their chains will have to be researched. Class will tape food chains onto the sun to show the energy source.

Explain: Class will watch Generation Genius Food Webs Video and discuss.
Elaborate: Students will use charts to make connections between food chains created earlier. Together, the class will make a food web.
Evaluate: Students will answer a series of questions about food chains and food webs in their science notebooks.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Assistance from teacher as needed.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: No modifications.
Explore: Completed in small group with directions repeated and assistance from teacher.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/food-webs-video-for-kids/

Day 11: Nearpod: Food Chains & Food Webs
Objective: I can explain how energy is transferred within a food web.
I can explain the role of producers, consumers, and decomposers.
I can describe the impact of removing or adding species to an exosystem on the food web in that area.
Essential Question: How is energy transferred in a food web?
Materials: Chromebook, Science Notebook, Pencil

Engage: Class will take a poll about food webs and food chains. Then, students will share their thoughts on energy transfer through organisms.
Explore: Class will explore an African Safari and observe how giraffes get their energy.
Explain: Class will review energy and key vocabulary through slides. Class will match vocabulary to definition on Nearpod. Class will watch a video on food chains and webs.
Elaborate: Students will work with a partner to label the food chain. Class will watch a video on a break in the chain and discuss.
Evaluate: Students will take a quiz on Nearpod about what they learned within the lesson.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions

- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Pre-teach vocabulary
Elaborate: Word bank or reference sheet to help label the food chain.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: Pre-teach vocabulary
Elaborate: Word bank or reference sheet to help label the food chain.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=b8e72178dc49a24ae87e73ed15fe8fd1-1

Day 12: Nearpod: Energy & the Sun
Objective: I can recognize that living things interact and depend on each other and their environment to meet their basic needs.
I can explain that producers make their own food using the process of photosynthesis.
I can describe the flow of energy through the food web, including the sun, producers, consumers, and decomposers.
I can explain interdependence of plants and animals in an ecosystem.
Essential Question: How is the sun's energy used by organisms in an environment?
Materials: Chromebook, Science Notebook, Pencil

Engage: Class will take a poll on what they know about energy from the sun. Then, they will share what they know about how plants get their energy.

Explore: Class will watch a time lapse of plants growing and observe. Class will discuss what plants need in order to grow.
Class will watch a video of koalas eating food and observe. Then, class will explain how koalas and plants get their energy.
Explain: Class will engage in slides that discuss the environment and the needs of living things. Class will match vocabulary to definitions. Class will review food chains.
Elaborate: Class will watch a video on how energy is transferred through food chains. Class will review slideshow on photosynthesis. Class will answer a question on how animals may benefit from photosynthesis. Class will watch a video on photosynthesis.
Evaluate: Students will explain how plants and animals help each other survive in an ecosystem and take a short quiz.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Pre-teach new vocabulary.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: No modifications.

Explain: Pre-teach new vocabulary.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Quiz will be read aloud,

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=9184a9d37598cc7ee4f1bc3135e561cf-1

Day 13: Nearpod: Herbivores
Objective: I can recognize that food is a source of energy living things need to grow and survive.
I can describe how herbivores obtain energy by eating plants.
I can explain how herbivores use behaviors and adaptations to obtain food.
I can use a model to describe how energy flows in a food chain.
I can describe how herbivores balance the ecosystem by spreading seeds.
Essential Question: How do herbivores obtain energy?
Materials: Chromebook

Engage: Class will take a poll on what they know about herbivores. Class will activate prior knowledge to see if they know of any animals that are herbivores.
Explore: Class will watch a video of animals eating. Class will record observations in science notebooks.
Explain: Class will review slides to understand needs of animals and review key vocabulary.
Students will complete matching and fill-in-the-blank on vocabulary reviewed. Class will watch video to expand understanding of vocabulary.
Elaborate: Class will play a game called “Time to Climb” to show their understanding of lesson.

Class will review birds being herbivores and watch a video.

Class will discuss food chains and watch a video. Then, students will circle the herbivore in a food chain.

Class will discuss herbivores impact on the ecosystem and watch a video.

Evaluate: Class will complete a quiz on Nearpod to show their understanding of lesson.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: Pre-teach new vocabulary.
Elaborate: No modifications.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: Pre-teach new vocabulary.
Elaborate: No modifications.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=4939afdfd6eefc087520370e76e6d634-1

Day 14: Nearpod: Carnivores

Objective: I can recognize that food is a source of energy that living things need to grow and survive.
I can describe how carnivores obtain energy by eating other animals.
I can explain how carnivores use behaviors and adaptations to obtain food.
I can use a model to describe how energy flows in a food chain.
I can describe the impact of removing carnivore species from a food chain.
Essential Question: How do carnivores obtain energy?
Materials: Chromebook, Science Notebook, Pencil

Engage: Class will take a poll to activate prior knowledge. Students will give an example of an animal that is a carnivore.
Explore: Class will watch a video of a chameleon eating, observe, and discuss their findings.
Explain: Class will engage in a slideshow that helps them to understand characteristics of animals and review key vocabulary.
Elaborate: Class will watch videos exploring food chains and animals within the food chain to enhance their understanding.
Evaluate: Class will take a quiz to show their understanding of the lesson.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Pre-teach vocabulary.
Elaborate: No modifications.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: Pre-teach vocabulary.
Elaborate: No modifications.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=0af6f0dc316dc2611a6cb01869093b1c-1

Day 15: Herbivores & Food Chain Experiment
Objective: I can explore how animals adapt to get the food they need to survive.
Essential Question: How do animals adapt to get the food they need to survive?
Materials: Random Materials, Toothpick, Net, Tweezers, Spoon, Scissors, Clothespin, Gummy Worms, Seeds, String, Uncooked Macaroni, Grass,

Engage: Teacher will place various items in the middle of a group of desks. Students will have to find a way to obtain the items without using their hands. Discuss how humans obtain their food.

Explore: Beak Experiment: Students will experiment with different bird "beaks" to determine which beak is best for each food item. Students will use a toothpick, net, tweezers, spoon, scissors, and clothes pin to pick up various objects. The objects can be gummy worms, seeds, string, uncooked macaroni, grass, etc. Students will determine which beak works best for each food and why.

Tasks/Scenarios

Station #1
Uh-oh! It's time for the birds to eat, but there are not enough worms. Who will survive!?

Task: Each person uses one utensil to see how many worms they can eat, but you are NOT allowed to use your hands.

Write the number of worms you picked up with each utensil below. Tell which utensil made it easier to get the worms.

Chopsticks ____ Clothespins ____ Forceps _____

Station #2
Some animals try to look, sound, or act like other animals so that they can trick their predators. Now, you're the hungry predator and you need to figure out what's really poisonous and what's fake, so that you can eat your prey!

Task: Find the 7 real gummy worms in the bowl of fake, poisonous gummy worms. Do NOT eat the gummy worms when you have found them.

What type of adaptation is this? Why do you think the real worms tried to "fit in" with the fake worms?

Station #3
What Can I Eat?
As preparation, place the beads, toothpicks, and pennies into separate pie pans.
Lay out the clothespins, chopsticks, tweezers, and spoons to the side along with the cups.

Students will be assigned to one type of bird based on the type of beak they use; the student will be a spoon bird, clothespin bird, chopstick bird, or tweezers bird.

Students will simulate birds eating by using the spoons, clothespins, chopsticks, or tweezers in their hands to eat bugs (pennies), seeds (beads), or worms (toothpicks) and place them in the belly of the bird (the cup).
Students will try picking up the different foods with their beaks and choose which food their bird is adapted to eating best based on how the beaks work. Students can look through the provided books to see actual bird beaks and what they are adapted to eat.

By answering the following questions, students will discover the purposes of the different beak shapes and how they help the birds eat.
Are these adaptations an example of structural or behavioral adaptations? Which type of beak did you have?
What food was your beak adapted to eating?
Does the shape and size of a bird's beak determine what it can eat? How? What specific birds can you think of or find in the books that have special beaks to help them eat?
Name the animal and describe its unique adaptation.
Why can a variety of bird live within the same habitat? How does the food supply not run out?

Explain: Class will watch one of the following videos and discuss the food chain of animals.
https://jr.brainpop.com/science/animals/foodchain/
Food Chains - https://www.youtube.com/watch?v=MuKs9o1s8h8

Class will pick a certain animal and create a food chain as a class.

Elaborate: In order to assess understanding, class will play Food Chain Game - Sheppard Software
http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm

Evaluate: Students will work with a partner to pick an animal out of a hat. Students will determine where that animal falls in the food chain by conducting research and presenting it to the class.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: No modifications.

Day 15: Extinction
Objective: I can explore why animals become extinct.
Essential Question: How do animals become extinct?
Materials: Pie Pan, Feathers, Paint, Oil, Water, Dish Soap

Engage: “How would you survive if all of the technology (cell phones, TV’s, computers, and video games) vanished from your neighborhood?” This is to engage students into a discussion of how animals adapt to change in their environment. “What would you do, and what would you call this change? Listen to student responses.

Explore: The class will watch a video on how animal habitats are destroyed or altered.Students will learn what happens to animals when their habitat changes and how they have to adapt to the change.

http://video.nhptv.org/video/1492029890/

Explain: When the movie is finished ask students to share with a partner what the movie was about and how they think we impact animal habitats (for about five minutes). Then write some of their ideas on the board.

Elaborate: Demonstration
Place the pie pans and feathers on a table and the oil (paint and oil), and water on a separate table. Discuss how they are going to see how oil spills affect birds and animals with feathers. Teacher will place a feather in the oil and see what it is like to get the oil off the feather

Materials: cold water, warm water, and dish soap with water.
What do you think will be the best method to remove the oil from the feather? Teacher will create class chart based on predictions.

Teacher will demonstrate getting the feather out of the oil with each of the liquids.

1. Add oil to the first pie pan
2. Add cold water to the second pie pan
3. Dip a feather in the oil pan and then put it in the cold water pan. Try to get the oil off
4. Add the hot water to the second pie pan and dip a feather in the oil and put it in the hot water pan trying to get the oil off
5. Add cold water and dish soap to the last pie pan. Dip the last feather in the oil and try and get the oil off by putting it in the soap and water pie pan

6. Ask the students why the soap and water method worked best. Why do they think an oil spill effects ocean life and why? How do they think the animals feel, do you think they can breathe with oil all over them? The students will share their ideas

Evaluate: How have humans and nature have impacted animals?

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.

Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Day 16 & 17: Generation Genius: Variation of Traits

Objective: I can observe related species and determine their similarities and differences.
I can explore how traits are passed from parents to offspring.
I can anaylze how some traits are caused by the environment.
Essential Question: How are traits developed among the same group of species?
Materials: Photos or examples of mom, dad, and baby puppies or other animals, Science notebooks, Pencils, Whiteboard and dry erase markers, Plant specimens of the same type, Bowl/Bag/Box for plant specimens.

Engage: Teacher will show students a litter of puppies and their parents. Have students observe similarities and differences.
Explore: Using the photos, class will make a chart in their science notebooks and on the board. Students will observe and make a list of their traits. Students will choose a puppy and write a paragraph comparing and contrasting the puppy with one or both of its parents.
Explain: Class will watch the Generation Genius Variations of Traits Video and discuss.
Elaborate: Students will explore variation of traits between individual plants. Each student gets their own specimen. Students make detailed sketches of their specimen. Students will include features that would help them to identify particular plants.
All specimen return to bag. The next day, have students find their specimen based on the traits they observed and sketched.
Evaluate: Students will write about a given scenario to show their understanding of variation of traits.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions

- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students may use their chromebooks to write a paragraph in order to use text to speech. Students also have the choice to fill out a compare and contrast T Chart with characteristics instead of paragraph.
Explain: No modifications.
Elaborate: Students will use a word bank in order to include specifics traits of their plant.
Evaluate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.

Tier III
Engage: No modifications.
Explore: Students may use their chromebooks to write a paragraph in order to use text to speech. Students also have the choice to fill out a compare and contrast T Chart with characteristics instead of paragraph.
Explain: No modifications.
Elaborate: Students will use a word bank in order to include specifics traits of their plant.
Evaluate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.

Link to Lesson Activities: https://www.generationgenius.com/videolessons/variation-of-traits-video-for-kids/

Day 18, 19, 20: Generation Genius: Animal Group Behavior (Multiple Days)
Objective: I can observe animals in person and through video to explore their behavior.
I can use observations as evidence to support scientific arguments about animal groups.
Essential Question: How do animals of the same species interact with one another?
Materials: Science Notebooks, Pencils
DIY Materials: 2 different sized plastic containers with lids, Sand, BBQ Skewer, Apple, Water, Tube of anys, Pin

Engage: Students will create classroom ant farms.

Explore: Class will answer the question: Do you think ants work together as a group or does each ant work alone? Class observes ant behavior. Students record behavior in science notebook.
Explain: Students will research ant behavior through websites, videos, pictures and observations and share their findings on a Google Slideshow.
Elaborate: Class will watch Generation Genius Adaptations Episode. Class will discuss.
Evaluate: Students choose their favorite animal discussed in the video. Students will watch live cams of their animals to observe their individual and group behavior. Then, students will share their observations and research in a poster or presentation format. This information will be presented to their peers.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: Extended time if necessary. Slideshow may include more pictures than facts.
Elaborate: No modifications.
Evaluate: Teacher assistance if needed to spell words or help proofread before placing on poster.

Tier III
Engage: No modifications.

Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explain: Extended time if necessary. Slideshow may include more pictures than facts.
Elaborate: No modifications.
Evaluate: Teacher assistance if needed to spell words or help proofread before placing on poster.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/animal-group-behavior-video-for-kids/

Extension Links:
https://www.brainpop.com/science/diversityoflife/ecosystems/
https://www.brainpop.com/science/ecologyandbehavior/foodchains/
https://jr.brainpop.com/science/animals/foodchain/
https://jr.brainpop.com/science/animals/camouflage/
https://jr.brainpop.com/science/animals/hibernation/
https://jr.brainpop.com/science/animals/migration/
https://jr.brainpop.com/science/plants/plantadaptations/
https://jr.brainpop.com/science/plants/plantlifecycle/
https://jr.brainpop.com/science/habitats/
https://jr.brainpop.com/science/conservation/extinctandendangeredspecies/

Unit Assessments: Animal Poster Project & Presentation, Experiment Diagrams & Questions, Food Chain Development, Ecosystem Analysis

Formative: Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals

Summative: Lab Sheets, Lab Activities, Creating Diagrams, Science Notebook Journaling

Science Unit 4 Grade 4	
Unit Title	Earth's Place in the Universe
Recommended Pacing	13 Days
Unit Summary	In this unit, students will explore how landscapes change over time. They will understand how to observe and analyze landscapes based on the rock formations that are present. They will identify the three different types of rocks and how each type of rocks tells something different about the past based on its features.
Career Readiness, Life Literacies, and Key Skills Standards	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7) ● Curiosity and willingness to try new ideas (intellectual risktaking) contributes to the development of creativity and innovation. ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.

	● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. ● 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
Computer Science and Design Thinking (Technology)	● The technology developed for the human designed world can have unintended consequences for the environment. ● 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ● 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ● 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ● 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Diversity, Equity, and Inclusion	● Videos included feature individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and

	some die. ● A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

Supplemental Class Resources	- Nearpod
	- BrainPop
	- Mystery Science
	- Generation Genius
	- iXL
	  - Compare fossils to modern organisms
	  - Compare ancient and modern organisms
	  - Interpret evidence from fossils in rock layders
	- Supplemental Resources found in Google Drive
	- Reading Wonders
	  - Unit 5 Week 6
	  - Minerals & Rocks

Disciplinary Core Idea	**Performance Expectation**
ESS1.C: The History of Planet Earth Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)	● Describe landscape of community focusing on topography, climate, water features, plants, and animals. ● Research to compare landscape from past to present. ● Model and label landscape of the past based on evidence. ● Recognize sedimentary rock formations and label ● Anaylze rock formations in virtual relaity and how they have changed over time. ● Classify types of rocks. ● Identify the rock cycle.

	● Relate rock formation to famous landmarks creaed by rock. ● Discover the rock cycle with relatable objects. ● Analyze layers of earth through experimentation. ● Model and explain their understanding of layers of earth based on experiment observations and discussion. ● Examine fossils and draw conclusions based on their findings. ● Research region where fossils are found to discover more of how fossils can tell us about the past. ● Infer based on information provided about fossils. ● Identify key vocabulary relating to fossils. ● Classify rocks and minerals. ● Discover rocks and minerals within the surrounding community.

Science & Engineering Practices	Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Identify the evidence that supports particular points in an explanation. (4-ESS1-1)
Articulation of DCI's Across Grade-Levels	● 2.ESS1.C (4-ESS1-1) ● 3.LS4.A (4-ESS1-1) ● MS.LS4.A (4-ESS1-1) ● MS.ESS1.C (4-ESS1-1) ● MS.ESS2.A (4-ESS1-1) ● MS.ESS2.B (4-ESS1-1)
Crosscutting Concepts	**Patterns** ● Patterns can be used as evidence to support an explanation. (4-ESS1-1)

	Connections to Nature of Science **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ● Science assumes consistent patterns in natural systems. (4- ESS1-1)

Math Student Learning Objectives Covered in this Unit
● MP.2 Reason abstractly and quantitatively. (4-ESS1-1) ● MP.4 Model with mathematics. (4-ESS1-1) ● 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS1-1)

ELA Student Learning Objectives Covered in this Unit
● W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1) ● W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources. (4-ESS1-1) ● W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4- ESS1-1)

Modifications
Unit 4 Modifications: Gifted and Talented: ● Student choice for projects ● Access to higher level texts/ articles ● Research opportunities as an extension of content being taught

- Strategic small groups based on Reading level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on Reading levels
- Differentiated project options and assessments

At Risk Students/504 Plans:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work

- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:
https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit Four: Earth's Place in the Universe	
NJ Student Learning Standards: Science Grade 4 **4-ESS1-1** - Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.	**Length: 13** **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly

	Collaborate with Others **Information, Media and Technology Skills** Information Literacy Media Literacy ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions:

- How has the landscape changed over time?
- How do rocks change?
- How are igneous, sedimentary and metamorphic rocks formed?
- What are the layers of the Earth?
- What can we tell about plants and animals from observing fossils?
- What information do fossils tell us?
- How can fossils help us to understand what happened in the past?
- What is the difference between rocks and minerals?

Learning Goals:

- I can explore landscapes for evidence to determine whether it has changed or remained over time.

- I can explain how to classify a rock as igneous, metamorphic, or sedimentary.
- I can describe how slow processes, such as weathering and erosion, and fast processes, such as volcanoes can cause rocks to form or change.
- I can describe how rock changes through the rock cycle.
- I can model how igneous, sedimentary, and metamorphic rocks are created.
- I can observe and record my results throughout the experiment.
- I can analyze my results and relate it to the types of rocks.
- I can build sedimentary rock layers.
- I can observe how Earth forces change the land.
- I can identify what fossils are, how they are formed and what we can learn from them.
- I can also explore how plants and animals become extinct.
- I can examine different fossils and information about them to make hypotheses about their history.
- I can explore how fossils are formed and what they tell about our past.
- I can explain the difference between rocks and minerals.
- I can observe and classify pictures of rocks and minerals.
- I can identify skills and concepts taught throughout the unit through a Rocks & Minerals Scavenger Hunt.

NJSLS Lessons:

Day 1 & 2: Generation Genius: Earth's Landscapes
Objective: I can explore landscapes for evidence to determine whether it has changed or remained over time.
Essential Question: How has the landscape changed over time?
Materials: Science Notebooks, Pencils, Paper, Drawing Materials, Materials to Construct Diorama

Engage: Class will go outside to observe local landscape. Students record observations about landscape in science notebook. Students will focus on topography, climate, water features, plants and animals.
Explore: Teacher will ask students if they think the landscape has always looked the way it did today. Studentswill provide evidence based on their observations. Class will watch Generation Genius Earth's Landscapes video.
Explain: Class will do research to find evidence as to whether or not landscape was once different.

Elaborate: Students create a drawing or model that shows what the landscape looked like at a certain time in the past based on the evidence they identified. On the second day, students will create their own Sedimentary Rock Formation Model and compare with actual sedimentary rock formations.
Evaluate: Students write an explanation about why they included different things in their drawing or model.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/earths-landscapes-video-for-kids/

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modification.
Explain: Students will be provided with websites to use in order to research. This research will be done in a small group with a teacher.
Elaborate: Teacher assistance when needed.
Evaluate: Students have the opportunity of answering verbally. If they answer with written work, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modification.

Explain: Students will be provided with websites to use in order to research. This research will be done in a small group with a teacher.
Elaborate: Teacher assistance when needed.
Evaluate: Students have the opportunity of answering verbally. If they answer with written work, students will be given sentence starters and a word bank for vocabulary.

Day 3 & 4: NearPod: The Rock Cycle
Objective: I can explain how to classify a rock as igneous, metamorphic, or sedimentary.
I can describe how slow processes, such as weathering and erosion, and fast processes, such as volcanoes can cause rocks to form or change.
I can describe how rock changes through the rock cycle.
Essential Question: How do rocks change?
Materials: Chromebooks

Day 3:
Engage: Students will activate prior knowledge by taking a poll about the rock cycle. Then, they will answer the question: How do you think rocks change? In their science notebooks.
Explore: Class will explore a virtual reality activity showing how rocks have changed over time. Class will record observations of what they noticed.
Explain: Class will define what rocks are and how they are classified.
Elaborate: Class will watch video on types of rocks and answer questions based on the information presented.
Evaluate: Class will match words to their definition to demonstrate their understanding of the vocabulary taught in the lesson.

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate

- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modifications.
Explain: Students will be pre taught the different types of rocks and provided a picture and a list of characteristics for each to refer back to.
Elaborate: No modifications.
Evaluate: Students will be pre taught the vocabulary words.

Tier III
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modifications.
Explain: Students will be pre taught the different types of rocks and provided a picture and a list of characteristics for each to refer back to.
Elaborate: No modifications.
Evaluate: Students will be pre taught the vocabulary words.

Day 4:
Engage: Class will do a quick review of things they learned from the previous lesson. Teacher will ask: how do you think rocks are formed? Students will answer in their science notebooks.
Explore: Class will learn about The Rock Cycle through slides.
Explain: Class will watch a video of the rock cycle. Class will look at a diagram of the rock cycle and label it.
Elaborate: Class will learn about the uses of rocks focusing on specific places in the world. Class will watch video of how rocks are used to create famous structures. Students will answer the question: Why do you think rocks are so useful to people? On Nearpod.

Evaluate: Students will take a seven question quiz on Nearpod to assess their understanding of the lessons taught over the past two days.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II

Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modifications.
Explain: Students will label diagram with a teacher.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: No modifications.

Tier III

Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: No modifications.
Explain: Students will label diagram with a teacher.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Questions will be read aloud to students.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=abcbbb443bcad1f5e9602896749857d5-1

Day 5 & 6 Rock Cycle Lab: Modeling with Starburst
Objective: I can model how igneous, sedimentary, and metamorphic rocks are created.
I can observe and record my results throughout the experiment.
I can analyze my results and relate it to the types of rocks.
Essential Question: How are igneous, sedimentary and metamorphic rocks formed?
Materials: Plastic Bags, Starbursts (3 per group), Water Basin, Textbooks (one per group)

Day 5:
Engage: Class will review different types of rock and what they need to do in order to get this type of rock.

Explore: Students will model the rock cycle with starburst candies. Students begin with 3 starbursts that are different colors.

Students take candies and stock them in plastic bag with the brightest or darkest color in the middle. Students will shade in their model on the lab sheet. Students squeeze air out of bag and place tower in middle of bag.

Students take stacked pieces and place on floor. Students place textbook on top of them. Candies remain under center of book. Students stand on textbook for one minute, get off the book, pick up the bag and remove candies. Students record their findings.

Students place candies back in bag. Students submerge cadies into hot water basin. Students keep candies under water for 30-45 sections. Students throw bag on floor, place a textbook on top and stand on book. Students stand on it for 5 seconds and repeat the process 2 more times. Students record results.

Students take candy and roll it into a ball. They place it into the baggie. Teacher will eat them overnight.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students will be able to use their diagram from the previous lesson.
Explore: Students have the opportunity to record their observations using pictures.

Tier III
Engage: Students will be able to use their diagram from the previous lesson.
Explore: Students have the opportunity to record their observations using pictures.

Day 6:

Explain: Class will watch BrainPop Video on types of rocks: https://www.brainpop.com/science/earthsystem/typesofrocks/
Then, students will observe their heated rocks. Students will draw and color their result.

Elaborate: Students will answer lab questions.

Evaluate: Class will discuss results and watch a video on how the three different types of rocks are formed.
Lesson Materials found in 4th Grade Google Drive

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary

- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
EExplain: No modifications.
Elaborate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Evaluate: No modifications.

Tier III
Explain: No modifications.
Elaborate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Evaluate: No modifications.

Day 7: Peanut Butter and Jelly Geology
Objective: I can build sedimentary rock layers.
I can observe how Earth forces change the land.
Essential Question: What are the layers of the earth?
Materials: White bread: limestone, Jelly: mud, Raisins: boulders , Pretzel sticks: fossil bones , Whole wheat bread: shale, Chunky peanut butter: conglomerate rock, Rye bread: sandstone, Paper plate, Plastic knife

Engage: Pass out the piece of white bread as you tell this story:

"It was millions and millions of years ago. The land was under a large ocean. As shelled animals died and floated to the bottom of the ocean, layer after layer started to pile up and put pressure on the layers beneath. Gradually, the bottom layers turned to stone."

Your piece of white bread represents the limestone made from the shelled animals.

Explore: Give a spoonful of jelly, pretzel sticks and raisins to each student

"Over time the ocean pulled back, leaving our piece of land near a river. Year after year the river flooded our piece of land leaving layer after layer of mud. (add jelly) Dinosaurs came to the river to drink, but some became stuck in the deep mud and died. (add pretzel sticks) Their bones sunk in the mud. Then one year the river had an enormous flood. Rocks and debris from the surrounding countryside was carried by the flooding waters into the mud of our land. (add raisins for boulders)"
Explain: Pass out whole wheat bread, peanut butter and rye bread

"More mud covered the boulders and the dead dinosaur bones. Year after year mud piled, layer upon layer. Each layer pressed upon the layers under it until the mud became shale. (add whole wheat bread for the shale) Smaller floods continued over thousands of years bringing dirt, small pebbles, and rocks onto our small piece of land."

Elaborate: Add peanut butter for conglomerate rock)

"Over time, the weather changed. It grew dry and the river dried up. Winds whipped over the land, causing weathering and erosion of a nearby mountain. That sand, over time, was deposited over and over again on our piece of land. Each layer of sand pressed down on earlier layers of sand. Finally, it became sandstone."

(add rye bread for sandstone). At this point hand out the plastic knife. The earth under our piece of land is not stable.
"Rumbling and shaking start to occur. Our piece of land is on a fault line! The ground shakes, the earthquake causes a fault to develop in the center of our piece of land! The land slips downward!"

Ask students to cut their sandwich in half at with the knife, then hold one piece up slightly lower than the other. Ask them to follow along, holding their sandwich to show what is happening as the story continues.
"When a piece of land slips down, it is called a normal fault. The land continued to rumble. Only fifty years later the earth slipped again, causing a major earthquake. This time the piece of earth went UP and over the other piece of land. This is called a reverse fault. All was quiet for almost 300 hundred years. But pressure was building. The earth continued to rumble, and finally a huge earthquake overtook our piece of land. This time the land scraped along side-by-side, each half going in opposite directions! This type of fault is called a strike-slip fault. Neither side moves up or down. Over time our piece of land went from below the ocean, to a mud pit, to a desert. Earthquakes have shaken our land and made it move. Time changes everything!"

Class will watch BrainPop video on The Rock Cycle and discuss: https://www.brainpop.com/science/earthsystem/rockcycle/

Evaluate: Students will explain their understanding by creating a detailed picture of what they observed.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Directions will be repeated. Teacher assistance when needed.

Tier III
Directions will be repeated. Teacher assistance when needed.

Day 8 & 9: Generation Genius: Fossils & Extinction - Earth's Landscapes
Objective: I can identify what fossils are, how they are formed and what we can learn from them.
I can also explore how plants and animals become extinct.
Essential Question: What can we tell about plants and animals from observing fossils?
Materials: Fossil example or picture, Science notebooks, Pencil, Whiteboard with markers
DIY Activity Materials: Modeling Clay, Plaster of Pasis Powder, Water, Cold cup of Coffee, Paintbrush, Toy Dinosaur, Plastic Gloves, Plastic Knife

Engage: Teacher will show students example of fossil. Students will explore and examine fossil. Students will record observations in science notebooks. Students will make a list of questions they have about the fossil they are exploring.
Explore: Class will discuss what they can learn from the fossil. Class will list all observations on board and then discuss what it might tell us.
Explain: Class will wacth Generation Genius Fossil & Extinction Video and discuss.
Elaborate: Students will pick a region where fossils are found. They will find examples of plants and animals in that region and determine what they can learn about them by looking at fossils. Class will watch BrainPop video on Fossils as an extension of the lesson.
https://jr.brainpop.com/science/land/fossils/
Evaluate: Teacher will make a drawing of a "fake" fossil. Students will write about what they can observe from the fossil using evidence.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students will have the opportunity to make observations verbally or using sentence starters and a word bank or by drawing a picture. Students will verbally ask their questions or write them down with teacher assistance.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students will complete this in a small group with teacher guidance. Students will fill in their findings using a graphic organizer for their answers.
Evaluate: Students will using a word bank, sentence starters or make their observations verbally.

Tier III

Engage: Students will have the opportunity to make observations verbally or using sentence starters and a word bank or by drawing a picture. Students will verbally ask their questions or write them down with teacher assistance.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students will complete this in a small group with teacher guidance. Students will fill in their findings using a graphic organizer for their answers.
Evaluate: Students will using a word bank, sentence starters or make their observations verbally.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/fossils-and-extinction-video-for-kids/

Day 10: Nearpod: Dig It!
Objective: I can examine different fossils and information about them to make hypotheses about their history.
Essential Question: What information can fossils tell us?
Materials: Chromebook

Engage: What kind of information can fossils tell us? Students will share their thoughts. Then, class will discuss what is it important to follow a process when doing experiments to review expectations for experiments.
Explore: Class will review what a hypothesis is. Then, they will practice by looking at a fossil and determining where is came from and how they know. Students will repeat this activity with a partner and share with the class.
Explain: Students will repeat activity on their own.
Elaborate: Students will determine what fossils cannot tell us and write about it on Nearpod.
Evaluate: Students will jot down what questions they still have. Students will reflect upon their understanding of the topic with a class poll.

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate

- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Teacher assistance when needed.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Students may verbally say their questions or have teacher assistance to write them down.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: Teacher assistance when needed.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Students may verbally say their questions or have teacher assistance to write them down.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=82a0abcf81bcb2cbe91f31d0fa5e92ae-1

Day 11 & 12: Gathering Fossils Nonfiction Reading Stations with Assessment
Objective: I can explore how fossils are formed and what they tell about our past.
Essential Question: How can fossils help us to understand what happened in the past?
Materials: Folders for each station, Reading Passages (Differentiated), Questions, Rubrics, Assessment

*Note: All centers have 3 levels of reading passages and questions that are asked based on student's individual reading level. Rubrics are provided for each passage so that all students are graded fairly.

Engage:

Explore: Students will engage in non-fiction reading centers where they will explore information about fossils. Students will be assigned to centers where they will rotate from working independently, with a partner, with a group and with the teacher.

Station 1: Students read a passage about Gathering Fossils with a partner. Students will draw conclusions about the fossil types that were found and their quantities. Then, they will answer multiple choice questions to shoe their understanding of the information in the nonfiction text.

Station 2: Students will compare T-Rex Fossils to Chicken Fossils. Students will find similitiaries and differences based on the text and explain. Then, they will answer multiple choice questions to show their understanding.

Station 3: Students will read a passage on how dinosaur fossils are formed. They will answer questions given in the text.

Station 4: Students will read about how scientists trace fossils. They will identify why fossils are so important and answer questions about the text.

Station 5: Students will read a passage called "Fossil Fact Finding". Students will agree or disagree with conclusions to facs given and support their claim. Then, they will answer multiple choice questions about what they read.

Elaborate: Vocabulary Cards - Students will each get a set of vocabulary cards and practice matching their vocabulary cards with their definition.

Evaluate: Assessment: Students will answer a set of true and false and matching questions based on the information provided in their centers passages. This will show their understanding of concepts provided.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II

Explore: All centers have 3 levels of reading passages and questions that are asked based on student's individual reading level. Rubrics are provided for each passage so that all students are graded fairly.

Elaborate: Students will be pre taught the vocabulary words.

Evaluate: All centers have 3 levels of reading passages and questions that are asked based on student's individual reading level. Rubrics are provided for each passage so that all students are graded fairly. Assessment will be based upon the level of their reading passage.

Tier III

Explore: All centers have 3 levels of reading passages and questions that are asked based on student's individual reading level. Rubrics are provided for each passage so that all students are graded fairly.

Elaborate: Students will be pre taught the vocabulary words.

Evaluate: All centers have 3 levels of reading passages and questions that are asked based on student's individual reading level. Rubrics are provided for each passage so that all students are graded fairly. Assessment will be based upon the level of their reading passage.

Day 13: Rocks & Minerals Scavenger Hunt
Objective: I can explain the difference between rocks and minerals.
I can observe and classify pictures of rocks and minerals.
I can identify skills and concepts taught throughout the unit through a Rocks & Minerals Scavenger Hunt.
Essential Question: What is the difference between rocks and minerals?
Materials: Rocks & Minerals Scavenger Hunt Cards, Scavenger Hunt Worksheet, Tape

Engage: In their science notebooks, students will answer the question: What is the difference between rocks and minerals? Class will discuss.

Explore: Students will be given pictures of different types of rocks and minerals to observe and classify.

Explain: Class will watch BrainPop video on Rocks & Minerals. https://jr.brainpop.com/science/land/rocksandminerals/

Elaborate: Students will complete Rocks & Minerals Scavenger Hunt with a partner.

Evaluate: Teacher will assess student work and review with groups to enhance their understanding of concepts taught. Students will complete a Rock Cycle Crossword Puzzle or Word Search if they have extra time.

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II

Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary. Explore: Students can use the chart that has the various characteristics of each type of rock. Explain: No modifications. Elaborate: No modifications. Evaluate: No modifications. **Tier III** Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary. Explore: Students can use the chart that has the various characteristics of each type of rock. Explain: No modifications. Elaborate: No modifications. Evaluate: No modifications.
Unit Assessments: Rock & Mineral Scavenger Hunt, Centers True/False & Matching Assessment **Formative:** Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals **Summative:** Lab Sheets, Lab Activities, Creating Diagrams, Science Notebook Journaling

Science Unit 5: Earth's Systems Grade 4	
Unit Title	Earth's Systems

Recommended Pacing	13 Days
Unit Summary	In this unit of study, students are expected to develop an understanding of the effects of weathering and the rate of erosion by water, ice, and wind. As students plan and carry out investigations using models and observe the effects of earth processes in the natural environment, they learn to identify patterns of change; recognize cause-and-effect relationships among the forces that cause change in rocks, soil, and landforms; and construct explanations of changes that occur over time to earth materials.
Career Readiness, Life Literacies, and Key Skills Standards	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7) ● Curiosity and willingness to try new ideas (intellectual risktaking) contributes to the development of creativity and innovation. ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills. ● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

	● 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
Computer Science and Design Thinking (Technology)	● The technology developed for the human designed world can have unintended consequences for the environment. ● 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ● 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ● 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ● 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ● 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Diversity, Equity, and Inclusion	● Videos included feature individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. ● Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. ● A variety of natural hazards result from natural processes. Humans cannot eliminate

	natural hazards but can take steps to reduce their impacts.

Supplemental Class Resources	- Generation Genius
	- Nearpod
	- Mystery Science
	- BrainPop
	- Google Drive Resources
	- iXL
	  - Changes in Earth's Surfce: Erosion
	- Reading Wonders
	  - Unit 1 Week 6
	  - Landforms Shaped By Weathering & Erosion
	  - Changing Landscapes

Disciplinary Core Idea	**Performance Expectation**
ESS2.A: Earth Materials and Systems Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2- 1) ESS2.B: Plate Tectonics and LargeScale System Interactions The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)	● Relate weathering and erosion to every day objects ● Conclude what happened to a specific area effected by erosion. ● Infer what may have happened in situations effected by erosion. ● Classify and explore physical weathering, water erosion, deposition, and wind erosion. ● Develop a model that explains what happens during weathering, erosion, and deposition. ● Describe rock formations of well-know landforms. ● Compare types of weathering and erosion ● Draw and label diagrams based on interpretation of wind erosion experiment.

ESS2.E: Biogeology Living things affect the physical characteristics of their regions. (4- ESS2-1)	● Connect what is learned about erosion to the real-world by exploring around school area. ● Identify weathering and erosion vocabulary. ● Infer how sand dunes are formed from wind erosion. ● Discover how beaches are eroding through experiment. ● Design a foldable of before and after effects of beach erosion. ● Collaborate to develop an idea to make community aware of beach erosion. ● Plan how to create a sandcastle that will withstand water and wind erosion. ● Collaborate to develop a sand castle that will withstand water and wind erosion. ● Identify mechanical weathering through experimentation. ● Analyze a map to infer where volcanoes form and erupt. ● Discover rocks formed by volcanic eruptions.

Science & Engineering Practices	Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1) Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Analyze and interpret data to make

	sense of phenomena using logical reasoning. (4-ESS2-2)
Articulation of DCI's Across Grade-Levels	● 2.ESS1.C (4-ESS2-1) ● 2.ESS2.A (4-ESS2-1) ● 2.ESS2.B (4-ESS2-2) ● 2.ESS2.C (4-ESS2-2) ● 5.ESS2.A (4-ESS2-1) ● 5.ESS2.C (4-ESS2-2) ● MS.ESS1.C (4-ESS2-2) ● MS.ESS2.A (4-ESS2-2) ● MS.ESS2.B (4-ESS2-2)
Crosscutting Concepts	**Patterns** Patterns can be used as evidence to support an explanation. (4-ESS2- 2) **Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2- 1)

Math Student Learning Objectives Covered in this Unit
● MP.2 Reason abstractly and quantitatively. (4-ESS2-1) ● MP.4 Model with mathematics. (4-ESS2-1) ● MP.5 Use appropriate tools strategically. (4-ESS2-1) ● 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS2-1) ● 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1), (4-ESS2-2)

ELA Student Learning Objectives Covered in this Unit
● RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2) ● W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS2-1) ● W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS2-1)

Modifications
Unit 5 Modifications: Gifted and Talented: ● Student choice for projects ● Access to higher level texts/ articles ● Research opportunities as an extension of content being taught ● Strategic small groups based on Reading level ● Individual project opportunities ● Critical thinking questions ● At home project suggestions Special Education: ● Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals ● Students will be provided with modified graphic organizers ● Modifications will be followed as stated in IEP ● Students will be provided small group instruction to ensure understanding of concepts ● Teachers will modify work when appropriate to meet individual needs ● Students will have access to “Read to Me” books ● Teacher will present information using a multi-sensory approach ● Strategic small group instruction based on Reading levels

- Differentiated project options and assessments

At Risk Students/504 Plans:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:
https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit Five: Earth's Systems	
NJ Student Learning Standards: Science Grade 4 • 4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. • 4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.	**Length: 13 Days** **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Information, Media and Technology Skills** Information Literacy Media Literacy ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** Adapt to Change

	Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions:

- What are the different forms of weathering and erosion?
- What is the difference between weathering and erosion?
- What processes break down rocks at Earth's surface?
- How has wind and water erosion effected my community?
- How can the processes of weathering and erosion affect and/or change beaches and shores?
- How is beach erosion caused?
- How can I create a sandcastle that can withstand wind or water erosion?
- What is mechanical weathering?
- Could a volcano pop up where you live?
- Why do some volcanoes explode?

Learning Goals:

- I can explore the difference between weathering and erosion.
- I can explain, identify, and connect the different forms of weathering and erosion.
- I can explore the science of weathering and erosion to understand how the Earth's surface changes.
- I can discover what happens during weathering.
- I can identify different ways material is moved through erosion.
- I can differentiate between weathering and erosion.
- I can describe the ways in which physical and chemical weathering change Earth's surface.
- I can recognize how a variety of landforms are created.
- I can explain the difference between physical and chemical weathering.

- I can analyze a picture to determine what happened in relation to erosion.
- I can explore wind and water erosion.
- I can identify evidence of erosion in my community.
- I can explore what impact erosion can have on a coastline through exploration.
- I can identify causes of beach erosion.
- I can brainstorm ways to make the public aware of causes of beach erosion.
- I can create a sandcastle that can withstand water and wind erosion.
- I can explore various agents of mechanical weathering.
- I can identify where volcanoes are in the world.
- I can analyze patterns of volcanoes on a map.

NJSLS Lessons:

Day 1: Introduction to Erosion & Weathering

Objective: I can explore the difference between weathering and erosion.
I can explain, identify, and connect the different forms of weathering and erosion.
Essential Question: What are the different forms of weathering and erosion?
Materials: Bar of Soap per team, Science Notebooks, Skittles/Peppermints/Candy Hearts, Bowls, Water

Engage: Students will each be given a piece of a bar of soap. The students will describe the soap as a team. Then, they will use water and their hands to change its shape. As the students complete the activity, discuss their observations.

When the activity is complete, ask the students to imagine a bar of soap that you leave in the shower. If you have a leaky faucet, drops of water will fall onto the soap in the same spot every day. After a while, the soap will form a hole in that spot. It will also no longer look like the same bar of soap. It will break in half or into smaller pieces. These pieces will be washed away down the drain when you turn the shower on. The breaking apart of the soap is an example of weathering. The movement of the soap's pieces is erosion.

Explain: Class viewing - Bill Nye Video, Erosion of "Rocks and Soil". This video will guide students thought process and eventual discovery of how weathering and erosion change and move materials over time.

Students will explain, identify, and connect the different forms of weathering and erosion

Elaborate: Teacher will ask the students "What do you think will happen to skittles in water, candy hearts in water and peppermints in water. The students will make their predictions and share them with the class. The teacher will pass out the materials and the students will observe and record their observations about the materials. Students will complete each experiment one at a time.

Skittles, Candy Hearts, and Peppermint Weathering & Erosion - Students will place skittles into water and observe what happens to the skittle. Students will work with a team to draw conclusions and make connections to weathering and erosion. Throughout the process, the class will discuss the components of the Scientific Method as they record all of their findings in their science notebook. Their science notebook will act as a communication device between teacher and student throughout the science content.

Evaluate: Students analyze a photo of a broken road near a beach to draw conclusions about erosion. This will lead into the exploration for the next day.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Students will follow along with the lesson. Directions will be repeated and there will be teacher assistance when needed.

Tier III

Students will follow along with the lesson. Directions will be repeated and there will be teacher assistance when needed.

Day 2: Generation Genius: Weathering & Erosion: Interaction of Earth's Spheres
Objective: I can explore the science of weathering and erosion to understand how the Earth's surface changes.
I can discover what happens during weathering.
I can identify different ways material is moved through erosion.
Essential Question: What is the difference between weathering and erosion?
Materials: Science Notebooks, Pencils, Sugar Cubes, Plastic Tray, Plastic Bag, Watering Can, Potting Soil/Sand, Clear Basin, Coarse Sand Paper, Limestone/Calcite/Other Soft stone

Engage: Class will look at a picture of a tree growing through a rock and discuss. Class will discuss cracks in the Earth's surface.
Explore: Class will identify causes of weathering and erosion like severe weather events. Class will brainstorm a list. Then, class will split into three stations to explore physical weathering, water erosion & deposition, and wind erosion.
Explain: Class will explain the difference between weathering and erosion by discussing the findings of each station. Then, class will watch the Generation Genius Weathering and Erosion Video and discuss.
Elaborate: Class will engage in DIY model to explain what happens during weathering, erosion and deposition.
Evaluate: Class will discuss the difference between weathering and erosion. Their lab sheets will count as the assessment for this lesson.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.

Tier III
Engage: No modifications.
Explore: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/weathering-and-erosion-video-for-kids/

Day 3: Nearpod: Physical & Chemical Weathering
Objective: I can differentiate between weathering and erosion.
I can describe the ways in which physical and chemical weathering change Earth's surface.
I can recognize how a variety of landforms are created.
I can explain the difference between physical and chemical weathering.
Essential Question: What processes break down rocks at Earth's surface?
Materials: Science Notebook, Pencil, Chromebook

Engage: Class will take a poll about how much they know about physical and chemical weathering. Then, the class will discuss what they think causes weathering.
Explore: Class will take a virtual visit to Arches National Park. Class will explore different rock formations. Class will discuss what caused the rocks to look the way they do.

Explain: Class will review slides about weathering, erosion and deposition. Then, they will answer the question: How are weathering and erosion similar and different?
Elaborate: Class will explore slides on physical weathering and learn new vocabulary. Students will work together to complete a chart to explain how each thing causes physical weathering. Class will repeat the process for chemical weathering. Class will watch a video to compare the two.
Evaluate: Students will read descriptions and match the descriptions to physical or chemical weathering.
Then, they will take a short quiz to show their understanding of lesson concepts.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Elaborate: Vocabulary will be pre taught.
Evaluate: Students will use a chart with characteristics of each to classify the types of weathering. Quiz will be read aloud.

Tier III
Engage: No modifications.
Explore: No modifications.

Explain: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Elaborate: Vocabulary will be pre taught.
Evaluate: Students will use a chart with characteristics of each to classify the types of weathering. Quiz will be read aloud.

Link to Lesson Activity:https://np1.nearpod.com/sharePresentation.php?code=3e398e497f0b6e0f36b8438414347656-1

Day 4: Modeling Erosion

Objective: I can analyze a picture to determine what happened in relation to erosion.
I can explore wind and water erosion.
I can identify evidence of erosion in my community.
Essential Question: How has wind and water erosion effected my community?
Materials: Erosion Pictures, Shoebox/Box, Dry Sand/Dry Soil, Plastic Wrap, Spray Bottle, Stones, Science Notebooks, Pencils, Water

Engage: Show students pictures and have them analyze what may have happened in relation to erosion. Discuss how erosion can happen in a variety of ways.

Explore: Wind erosion: Fill a clear shoebox about 1/4 full of dry sand or dry soil. Tape a piece of clear wrap over most of the top. Leave a space for your hand to reach in. This will prevent blowing sand from getting out and into eyes. Reach in with a syringe or spray bottle. Use it to blow air over the sand. Direct the syringe so you can carve gullies and valleys with wind. Observe the movement of sand - where it blows and the shapes it forms. Next place some stones around the sand. Again make wind with the syringe. Do the rocks make a difference in how the soil is eroded? Have students draw diagrams and label what happens.

Water erosion: Raise one end of the erosion tray. Fill the syringe or spray bottles with water. (You might try it both ways and notice the difference.) Sprinkle water on the sand. Notice the movement of sand. It should be forming gullies. Place several rocks across the surface and sprinkle again. do the rocks change the way the water eroded the sand? Discuss the direction that eroded material travels (uphill,

downhill?) Have the students build a mountain with the sand. Make one side rather steep. Aim water at the base of the cliff. Demonstrate how water can undercut a hillside and cause a landslide. Push the sand to one end to form a beach. Use fingers to cause waves and watch the sand erode away.

Explain: Class will discuss different types of erosion
https://www.brainpop.com/science/earthsystem/erosion/

Elaborate: Take the students on a walking field trip around the schoolyard. Look for evidence of erosion. Look especially where sand collects (e.g., around the swing set, at the edge of the playground, at the doors to the building).

Have them record their observations and explanations in a science log.

Evaluate: Exit Ticket - How do eroded materials become part of soil? What has to happen to the sediments in order to support plant life?

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank. Students may answer the exit ticket verbally.

Tier III

When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank. Students may answer the exit ticket verbally.

Day 5: Wind as an Agent of Erosion

Objective: I can explore what impact erosion can have on a coastline through exploration.
Essential Question:
How can the processes of weathering and erosion affect and/or change beaches and shores?
Materials: Small Plastic Tub with Sand (Sand should be pushed to one side of the plastic tub), Spatula, Plastic Straws, Trash Can, Dust Pan, Goggles, Chalk, Salt, Cups

Engage: Students will be placed in teams and given a piece of chalk. Students will observe the piece of chalk and describe their observations to the class. Students will then examine a cup of salt. They will observe the salt and describe/record their observations with the class.

Explore: The teacher will ask the students what they think will happen when the chalk and the salt are placed in the same container and shaken. Students will turn and talk. They will record their predictions and share them with the class. Students will then be given their materials to explore. Give groups of students a cup half-filled with salt and a colored piece of chalk. Have them take turns stirring the colored chalk through the salt.

Explain: Two things will happen: the salt will be colored and the chalk piece will wear away. Relate this to wind blowing sand on rocks and wearing them away like the formations seen southern Utah. (Instead of wind blowing sand against Arches, tell them the chalk represents Arches and they are moving Arches through the sand.)

Vocabulary:
Coast- the place where the water meets the beach or shoreline.
Erosion – the loss of sand due to slow or rapid processes
Habitat- a place where plants and animals live
Revetment- a shore protection structure made of large rocks to protect buildings and property from the damage from waves and storm waters.
Seawall-a concrete or steel wall used as a shore protection structure.

Sediment- sand, shells, silt, or any grainy material moved by currents or waves.

Elaborate: In small groups the teacher will ask the students to turn and talk about what impact they think erosion can have on a coastline. Once students have had enough time to discuss, the small groups will share out while the teacher record ideas on chart paper (create a web so that students are about to add to it as the lesson continues).
The teacher will pass around cupfuls of different types of sand. In small groups, students should brainstorm what they think sand is made out of. After students have had a chance to discuss their ideas, the groups should share out whole group while the teacher records ideas on chart paper. The class will discuss what sand is made from.

The sand should start at one edge of the pan. The wind simulator will gently blow through the straw horizontally at the sand. The wind simulation should take about 30 seconds. Record observations.

Evaluate: How do sand dunes form? Explain your thinking. What happens when you blow on the sand? Could you make the whole pile move if you blew long enough?

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Students will be pre taught the new vocabulary.
Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.

Evaluate: Students may answer the questions verbally, or using sentence starters and a word bank.

Tier III

Engage: No modifications.

Explore: No modifications.

Explain: Students will be pre taught the new vocabulary.

Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.

Evaluate: Students may answer the questions verbally, or using sentence starters and a word bank.

Day 6: Water as an Agent of Erosion

Objective: I can identify causes of beach erosion.

I can brainstorm ways to make the public aware of causes of beach erosion.

Essential Question: How is beach erosion caused?

Materials: Small plastic tub full of water, Sand , Spatula , Paper Towels , Trashcan, Science Notebooks, Pencils

Engage: Create a Wave Simulator - The wave simulator will gently rock the plastic tub back and forth simulating rocking back and forth on the sandy shore. To simulate the waves should only take about 30 seconds. Students will record their observations.

Explore: How does the weight of water affect the earth? In the 8" X 8" aluminum pan, students should rebuild their sand dune. Next, students should pour a cupful of water on it. Repeat on the same spot, but this time hold the cup from as high a distance as possible. Q. How did the earth change when you poured your first cupful of water? How did it change when you poured the second cupful from a greater height? Can you relate this to changes caused by the weight of water in various places around the earth?

Explain: Students will gather on the carpet in front of the chart titled "erosion". Students should be encouraged to turn and talk about what they would like to see added to the chart. Whole group discussion will follow while the teacher records ideas on the web.

What is Sand made of and why are our Beaches eroding?

Sand is made out of tiny particles of shell, rocks, and minerals. Sand is formed and taken away by erosion. When the weathering of rocks and stones occur then sand is formed. On the contrary, when the wind and water washes out areas of sand, erosions occurs against the will of sand.

Battle of Beach Movement: On one side of the battle are the forces beneath the surface. These forces cause the crust to be faulted, folded, tilted, and lifted. On the other side of the battle are the natural processes of weathering and erosion. Once rock has been broken up by weathering the small pieces can be moved by water, ice, wind, or gravity. Everything that happens to cause rocks to be carried away is called erosion.

Elaborate: Students can create a foldable of the before and after effects of beach erosion (wind erosion before and after; water erosion before and after; and storm erosion before and after.) The foldable will be in a flip style and should be divided into 3 sections. On the front flaps will be the titles of the erosion types and a picture of the beach before the type of erosion occurred. On the inside flap, the students will draw a diagram of what the beach looked like after the erosion had its impact. Students should be encouraged to create diagrams (both pictures and labels/vocabulary).

Evaluate: Students will be asked to develop an idea for how they are going to make the public aware of the impact the beach erosion has on coastlines. (More specifically, how sand erosion can be prevented to help the wildlife and the public). Students will receive an 8" X 10" sheet of white paper to design a campaign poster that informs the public of the beach erosion problem on the NJ coastline and what they can do to help.

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II

Engage: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: No modifications.
Elaborate: Students will follow along with a teacher to complete this activity.
Evaluate: Students can draw their poster and will be given teacher assistance to spell any words they need.

Tier III
Engage: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: No modifications.
Elaborate: Students will follow along with a teacher to complete this activity.
Evaluate: Students can draw their poster and will be given teacher assistance to spell any words they need.

Day 7, 8, 9 - Wind & Water Erosion Assessment

Objective: I can create a sandcastle that can withstand water and wind erosion.
Essential Question: How can I create a sandcastle that can withstand wind or water erosion?
Materials: Foil Pans, Sand, Water, Other (based on student brainstorm)
Engage: Show a picture of a sand castle. Do you think the sand castle will be there the next day? Why or why not? Turn and talk to a partner to explain your reasoning. Class will discuss ideas.

Explore: Students will work with a team to create their own sandcastle. Students will ask, “How can I create a sand castle that will withstand water and wind erosion?”. Students will brainstorm their ideas individually and share their individual ideas with a group in order to come up with a plan. Once the plan is approved by the teacher, the students will create their sand castle.

Explain: Once all groups have completed their sand castle, students will present how they created their sandcastle based on the requirements given.

Elaborate Students will have the option of demonstrating water or wind erosion on their model. Students will reflect on their model and what they could have done differently to improve on their model in order to prevent erosion and weathering.

Evaluate: Exit Ticket - List Types of Erosion; Draw two pictures of a sand castle that has experienced erosion - before and after; Why is it important to learn about erosion?

Differentiation:

General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II

Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Exit ticket can be answered verbally.

Tier III

Engage: No modifications.
Explore: No modifications.
Explain: No modifications.

Elaborate: No modifications.
Evaluate: Exit ticket can be answered verbally.

Day 10 & 11: Mechanical Weathering
Objective: I can explore various agents of mechanical weathering.
Essential Question: What is mechanical weathering?
Materials: Sugar Cube, Pebbles, Container, Science Notebook, Pencil, Water, Cups, Clay, Plastic Bag, Ruler

Engage: The class will brainstorm a list of different bodies of water.
Explore: Sugar Cube & Pebbles - Students will take an empty container and fill it with small pebbles. Students will observe sugar cube before putting it into the container. Then, they will drop 5 sugar cubes into container and close lid. The will shake the container and observe what happened to the sugar cubes.

Sugar Cube & Water - Students will repeat the experiment, but add water. Students will observe that the water will dissolve sugar cubes. Discuss different bodies of water and how a quiet stream and crashing waves affects rocks differently

Explain: The class will discuss how rocks in bodies of water move around bumping into one another which causes them to break down.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: No modifications.

Tier III
Engage: No modifications.
Explore: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explain: No modifications.

Day 11
Freezing water as an agent of weathering - Wet a chunk of clay about the size of a grapefruit. Roll it into a ball. Place the ball in a plastic bag and put it in the freezer. Leave it overnight. Next day, removed the clay from the freezer. Its surface should be slightly cracked and broken. Ask students to record their observations.

Wet the clay again, taking care not to close up the cracks that have been formed. Put it back into the freezer for another night. On the following day, take it out and have students observe what has happened to the cracks. Measure the cracks. You could repeat this process several more times, watching the cracks widen. Discuss how this relates to the breaking down of rocks on a larger scale. Compare this to autumn rains filling cracks in the rocks (and sidewalks) then freezing during the winter.

Evaluate: Exit Ticket - Provide a real-world example of erosion and weathering based on our discussion. Share it with the class.

Differentiation:
General Accommodations/Modifications:
- Extended time for assignments

- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Evaluate: No modifications.

Tier III
Elaborate: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Evaluate: No modifications.

Day 12: Mystery Science: Volcanoes & Patterns of Earth's Features
Objective: I can identify where volcanoes are in the world.
I can analyze patterns of volcanoes on a map.
Essential Question: Could a volcano pop up where you live?
Materials: Volcano Discoveries Worksheet, Volcano Mapping Printout, Colored Pencils

Engage: Students will watch a video that shows lava impacting the landscape. Then, students will discuss if they think it is possible for a volcano to pop up where they live.

Explore: Students will look at a map to identify where volcanos have erupted in Mexico. They will look for volcanic patterns.
Students will get a map of a section of the world and mark where all volcanoes are on the map using latitude and longitude lines.

Explain: When students finish plotting where volcanoes are on their map, students will complete the Volcano Discoveries questions. Teacher will tape maps together to show where volcanoes are in the world.

Elaborate: As a class, students will discuss where volcanoes mostly are. Then, they will draw a path that connects most of the volcanoes on the map. Class will watch a video after discussion and determine if there are any volcanoes close to where they live.

Evaluate: Class will watch a final video and hand in their lab sheets as the exit ticket.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Students will follow along with a teacher using longitude and latitude lines.
Explain: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Elaborate: Students will follow along with a teacher.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: Students will follow along with a teacher using longitude and latitude lines.

Explain: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Elaborate: Students will follow along with a teacher.
Evaluate: No modifications.

Link to Lesson Activity: https://mysteryscience.com/rocks/mystery-1/volcanoes-patterns-of-earth-s-features/53

Day 13: Mystery Science: Volcanoes & Rock Cycle
Objective: I can explain the differences in the shape and eruption patterns among volcanoes.
Essential Question: Why do some volcanoes explode?
Materials per Student: - Pencil, Lava Experiments Printout, Assessments: Why do some volcanos explode?
Materials for Teacher Demo: Lava Mat Printout, 1 Table Covering, 2 Clean Plastic Cups, Thin Lava (1 Cup Water), Thick Lava (1 Cup Flour + ¾ Cup Water) , Red Food Coloring for Lava, Measuring Cup, 1 Plastic Spoon, 1 Plastic Straw, Mixing Bowl

Engage: Class will watch video on Mystery Science
Explore: Teacher will conduct lava demonstrations.
Explain: Class will continue watching explanation on Mystery Science Video.
Elaborate: Students will compare thin vs. thick lava through observing the experiment.
Evaluate: Students will complete Google Form as an exit ticket relating to the experiment.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions

- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students can make observations verbally.
Evaluate: Exit ticket will be read aloud to students.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: Students can make observations verbally.
Evaluate: Exit ticket will be read aloud to students.

Link to Lesson Activity: https://mysteryscience.com/rocks/mystery-2/volcanoes-rock-cycle/55

Unit Assessments: Sand Castle Experiment Lab Sheet & Diagrams, Beach Erosion Poster

Formative: Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals

Summative: Lab Sheets, Lab Activities, Creating Diagrams, Science Notebook Journaling

Science Unit 6: Earth & Human Activity
Grade 4

Unit Title	Earth and Human Activity
Recommended Pacing	15 Days
Unit Summary	In this unit of study, students apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps.
Career Readiness, Life Literacies, and Key Skills Standards	● Culture and geography can shape an individual's experiences and perspectives. ● 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8). ● Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas. ● • 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). • 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data ● Accurate and comprehensive information comes in a variety of platforms and formats and is the basis for effective decisionmaking. ● 9.4.5.IML.4: Determine the impact of implicit and explicit media messages on individuals, groups, and society as a whole. ● 9.4.5.IML.5: Distinguish how media are used by individuals, groups, and organizations for varying purposes. (e.g., 1.3A.5.R1a). ● Different digital tools have different purposes. ● 9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each. ● 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings. ● 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.
Computer Science and Design Thinking (Technology)	● Data can be organized, displayed, and presented to highlight relationships ● 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

	● Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data. ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim ● Many factors influence the accuracy of inferences and predictions. ● 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. ● Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. ● Often, several design solutions exist, each better in some way than the others. ● 8.2.5.ED.1: Explain the functions of a system and its subsystems. ● 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. ● 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ● Engineering design requirements include desired features and limitations that need to be considered. ● 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). ● 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. ● 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.
Diversity, Equity, and Inclusion	● Videos included feature individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.

Climate Change	● When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. ● Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. ● Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways. Some resources are renewable over time and others are not. ● A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. ● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

Supplemental Class Resources	- Generation Genius
	- Nearpod
	- Mystery Science
	- BrainPop
	- iXL
	  - Evaluate natural energy sources
	  - Evaluate multiple design solutions to preventn flooding
	  - Identify the best design solution to presvent hurricane damage
	- Reading Wonders
	  - Unit 3 Week 6
	  - Kids Lead the Way
	  - Earth Day Action
	  - Challenging Times: The 1886 Earthquake

	- Unit 6 Week 6
	  - Renewable & Nonrenewable Energy
	  - Planet Power

Disciplinary Core Idea	Performance Expectation
ESS3.A: Natural Resources Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3- 1) **ESS3.B:** Natural Hazards A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4- ESS3-2) **ETS1.B:** Developing Possible Solutions Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)	● Brainstorm a list of severe weather. ● Identify what causes each type of severe weather. ● Compare and contrast types of severe weather. ● Research effects of severe weather. ● Analyze amount of water on Earth and its distribution. ● Identify sources of water . ● Create poster to promote how to use water wisely. ● Analyze weather forecasts to make predictions. ● Collect data to make predictions about future weather. ● Create weather vane to demonstrate understanding of weather tools. ● Identify the difference between weather and climate. ● Experiment to show edangers of natural disasters. ● Illustrate and redesign models to withstand specific natural disasters. ● Relate understanding of severe weather to severe weather event in sarea.

	● Analyze preventative measures in place for types of severe weather and natural disasters. ● Identify the difference between renewable and nonrenewable resources. ● Collect data on resources used in NJ to differentiate which are renewable and onrenewable. ● Aanalyze renewable and nonrenewable resources to weigh out their pros and cons. ● Classify renewable and nonrenewable resources into a chart. ● Communicate importance of conservation of resources through creation of poster. ● Categorize resources in chart. ● Explore virtual reality locations to show renewable energy sources and how they work. ● Design and collaborate to make a waterwheel.

Science & Engineering Practices	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. Obtain and combine information from books and other reliable media to explain phenomena. (4- ESS3-1)

Articulation of DCI's Across Grade-Levels	● K.ETS1.A (4-ESS3-2) ● 2.ETS1.B (4-ESS3-2) ● 2.ETS1.C (4-ESS3-2) ● 5.ESS3.C (4-ESS3-1) ● MS.PS3.D (4-ESS3-1) ● MS.ESS2.A (4-ESS3-1), (4-ESS3-2) ● MS.ESS3.A (4-ESS3-1) ● MS.ESS3.B (4-ESS3-2) ● MS.ESS3.C (4-ESS3-1) ● MS.ESS3.D (4-ESS3-1) ● MS.ETS1.B (4-ESS3-2)
Crosscutting Concepts	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1) Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3- 2) **Connections to Engineering, Technology, and Applications of Science** Interdependence of Science, Engineering, and Technology Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3- 1) **Influence of Science, Engineering and Technology on Society and the Natural World** Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1) Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

Math Student Learning Objectives Covered in this Unit
● MP.2 Reason abstractly and quantitatively. (4-ESS3-1), (4-ESS3-2) ● MP.4 Model with mathematics. (4-ESS3-1), (4-ESS3-2)

- 4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-1), (4-ESS3-2)

ELA Student Learning Objectives Covered in this Unit

- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)
- W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS3-1)
- W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS3-1)
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4- ESS3-1)

Modifications

Unit 6 Modifications:

Gifted and Talented:
- Student choice for projects
- Access to higher level texts/ articles
- Research opportunities as an extension of content being taught
- Strategic small groups based on Reading level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:
- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP

- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on Reading levels
- Differentiated project options and assessments

At Risk Students/504 Plans:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Modifications followed as stated in 504 plan
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

Additional Modification Option:

https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf

Unit Six: Earth and Human Activity	
NJ Student Learning Standards: Science Grade 4 ● **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. ● **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	**Length: 15 Days** **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** **highlight appropriate indicators for unit/domain** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Information, Media and Technology Skills** **highlight appropriate indicators for unit/domain** Information Literacy Media Literacy

	ICT (Information, Communicationcs and Technology Literacy) **Life and Career Skills** **highlight appropriate indicators for unit/domain** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

Essential Questions:

- What are different types of severe weather?
- Why is it important to protect Earth's freshwater sources?
- How can we predict the weather using data and tools?
- What types of structures are needed to stay safe from natural disasters?
- How can we reduce the impact of natural hazards in our area?
- What is the difference between renewable and nonrenewable resources?
- What are renewable resources?
- What are renewable and nonrenewable resources and how are they important to us?
- What do we use energy for?
- How is fuel used to create energy?

Learning Goals:

- I can explore how severe weather has shaped the world.
- I can explore the distribution and composition of water on Earth.
- I can distinguish the properties of various sources of water.
- I can determine the limited amounts of freshwater available for human consumption.

- I can understand water conservation and recommend ways to converve Earth's freshwater.
- I can identify the tools that are used to provide information about predicting the weather.
- I can explore the science of natural disasters.
- I can identify how natural hazarads have an impact on organisms and and environment.
- I can anaylze how to design a space to protect people from natural disasters.
- I can explore extreme weather events that can occur in my area.
- I can identify cause and effect relationships between natural extreme events and the programs they cause humans.
- I can collaborate to explore ways humans can reduce the impact of some natural hazards.
- I can compare the difference between renewable and nonrenewable resources.
- I can classify natural resources as renewable or nonrenewable.
- I can describe the advantages and disadvantages of renewable energy.
- I can explain the importance of conservation.
- I can identify that to live, humans need resources found on earth and not all of these resources are renewable.
- I can differentiate between renewable and non-renewable resources.
- I can classify resources as renewable and non-renewable.
- I can identify sources of renewable energy and how they work.
- I can analyze the types of fuel that is used to generate energy.
- I can design, build, and present a renewable energy device.
- I can list pros and cons of renewable and nonrenewable energy.

NJSLS Lessons:

Day1: Introduction to Severe Weather

Objective: I can explore how severe weather has shaped the world.
Essential Question: What are different types of severe weather?

Engage: *What do you know about extreme weather on Earth?* Encourage students to think about weather they have experienced, read about, or seen on TV or in the movies. Have students brainstorm a list of weather-related words and phrases. Encourage students to

include words such as lightning, hail, sleet, rain, wind, gust, flood, snow, blizzard, storm, hurricane, tornado, cyclone, thunder, dust storm, and temperature.

Explore: Show students images from the photo gallery Extreme Weather. Read aloud the captions as you scroll through the images.

Explain: Then, show the National Geographic video "Weather 101." Pass out the three dry-erase markers again. Have students add words related to the photos or video to the list on the board. Assist them, as needed. Then explain to students that some words from the list are weather events, and some words are part of those weather events; call the latter "ingredients." For example, a lightning storm is a weather event. Ask: *What words from our list can be part of a lightning storm?* Elicit responses such as lightning, clouds, rain, wind, and thunder.

Elaborate: Have students work in pairs or as a whole class to identify other weather events and the ingredients for each from their list. Help students to find answers to any questions they have, including definitions of words that are new to them. Their answers should include the following:

- Thunderstorm: rain, clouds, lightning, thunder, wind
- Tornado: clouds, strong wind, rain, hail
- Hurricane or cyclone: strong wind, heavy rain
- Blizzard: heavy snow, ice, cold temperatures
- Dust storm: strong winds, arid conditions
- Flood: heavy rainfall
- Hail storm: cold or warm temperatures, rain, ice
- Ice storm: freezing rain

Evaluate: Ask: *How are the ingredients for each weather event the same? How are they different?* Help students to identify that many weather events have certain ingredients in common, including wind, clouds, and high or low temperatures.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Teacher assistance as needed.
Elaborate: Teacher assistance as needed.
Evaluate: Venn diagram to show the ingredients that are the same and different.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: Teacher assistance as needed.
Elaborate: Teacher assistance as needed.
Evaluate: Venn diagram to show the ingredients that are the same and different.

https://www.nationalgeographic.org/activity/extreme-weather-on-our-planet/
http://weather.thinkport.org/

Day 2 & 3: Nearpod: Earth's Water

Objective: I can explore the distribution and composition of water on Earth.
I can distinguish the properties of various sources of water.
I can determine the limited amounts of freshwater available for human consumption.
I can understand water conservation and recommend ways to converve Earth's freshwater.
Essential Question: Why is it important to protect Earth's freshwater sources?
Materials: Chromebook, Science Notebook, Pencil, Poster Paper, Coloring Utensils

Day 2:
Engage: Class will take a poll to assess their prior knowledge.
Explore: Class will discuss how people use water.
Explain: Class will explore the amount of water available on Earth. Class will enter VR activity to explore further.
Elaborate: Students will answer the question: What do you notice about the amount of water on Earth? Do you think that there is enough for humans, plant, and animals? Class will discuss the distribution of water.
Class will watch an interactive video to understand this concept with quick checks embedded.
Evaluate: Class will write about what they learned about the distribution of water. Sentence starters are provided to assist students in their thinking.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.

Explore: No modifications.
Explain: No modifications.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Evaluate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

<u>Day 3:</u>
Engage: Students will make a list of different sources of water in their science notebooks. Then, students will learn about different sources of water. Then, students will complete a check for understanding fill in the blank.
Explore: Class will review sources of water. Class will play a match game identifying those sources of water.
Explain: Students will work with a partner to complete a graphic organizer about freshwater sources available for humans.
Elaborate: Students will complete critical thinking question of human use of water. Then, class will discuss water conservation. Students will work with a partner to explore the website: wateruseitwisely.com to find tips on how to use water wisely. Students will find their 3 favorite tips, create a poster and illustrate it.
Evaluate: Students will present poster to the class. Students will take a wrap-up quiz to show their understanding of the lessons over the past two days.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Various materials for all levels will be used for students to learn about different sources of water.
Explore: No modifications.
Explain: Sentence starters and word banks will be available for student use.
Elaborate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Evaluate: No modifications.

Tier III
Engage: Various materials for all levels will be used for students to learn about different sources of water.
Explore: No modifications.
Explain: Sentence starters and word banks will be available for student use.
Elaborate: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=2c0a11af58f0d444b69a2f2c73a1b588-1

Day 4 & 5: Generation Genius: Weather vs. Climate
Objective: I can identify the tools that are used to provide information about predicting the weather.
Essential Question: How can we predict the weather using data and tools?
Materials: Tools to Collect Weather Data, Science Notebooks, Pencils, Weather Forcasts, Temperature and Precipitaton Graphs from the Area
DIY Activity Materials: 1 Plastic Straw, 2 Paper Plates, Marker, Pencil, Scissors, Tape, Poster Board, Straight Pin, Ruler, Modeling Clay, Table Fan

Engage: This section should be done without looking at weather forecasts. Students look outside. Have them describe weather in science notebooks and predict weather for tomorrow.
Explore: Students make prediction in science notebook. Teacher will ask students what kind of data they could collect that would help them make more accurate predictions. Students make second prediction based on knowledge.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Tier III
Engage: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.
Explore: Students have the opportunity of answering verbally instead of in science notebook. If they answer in science notebook, students will be given sentence starters and a word bank for vocabulary.

Day 5
Explain: Students come to class following day with local weather forecast. Students share the weather forecasts and compare to predictions.
Class watches Generation Genius Weather vs. Climate video. Class will discuss.
Elaborate: Students build wind vane as DIY activity.
Students make predictions about what the weather might be on their birthday and explain how they know. Class will discuss weather vs. climate.
Evaluate:Students will complete exit ticket provided to show their understanding of weather and climate.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: Students may complete exit ticket verbally.

Tier III
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: Students may complete exit ticket verbally.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/weather-vs-climate-video-for-kids/

Day 6: Generation Genius: Extreme Weather Solutions- Natural Disasters
Objective: I can explore the science of natural disasters.
I can identify how natural hazards have an impact on organisms and and environment.
I can analyze how to design a space to protect people from natural disasters.
Essential Question: What types of structures are needed to stay safe in natural disasters?
Materials: Science notebooks, Pencils
Station 1: Wooden blocks, Lego Blocks, Cookie SHeet
Station 2: Tray that can hold water, Water, Sand, Plastic Objects, Small Ball, Large Ball
Station 3: Yogurt, Graham Crackers, Paper Plates, Spoon
DIY Activity: Box, Scissors, Rubber Bands, Marker, Paper Strip, Ruler, Cell Phone

Engage: Class will look at a cardboard box vs. a metal box. Students observe and describe. Which would withstand an earthquake? Class will discuss.
Explore: Class will explore volcanoes, earthquakes and tsunamis. They will learn about their causes through stations.
Station 1: Shaky Ground

Station 2: The Tsunami Effect
Station 3: Shifting of the Continents
Station 4: Volcanic Eruption

Students will answer experiment questions at each station in their science notebooks.
Explain: Class will discuss dangers of natural disasters. Class will watch the Generation Genius Natural Disasters video as a class.
Elaborate: Students create seismographs as the DIY activity.
Evaluate: Class will discuss what kinds of buildings can withstand an earthquake. Students will write and illustrate how they would redesign models used in demonstrations to be better suited to withstand earthquakes.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Teacher assistance when needed, students will be able to use word bank and sentence starters.

Tier III

Engage: When recording observations, students may draw their observations, state their observations verbally or write them using sentence starters and word bank.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Teacher assistance when needed, students will be able to use word bank and sentence starters.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/natural-disasters-video-for-kids/

Day 7: Generation Genius: Extreme Weather Solutions
Objective: I can explore extreme weather events that can occur in my area.
I can identify cause and effect relationships between natural extreme events and the programs they cause humans.
I can collaborate to explore ways humans can reduce the impact of some natural hazards.
Essential Question: How can we reduce the impact of natural hazards in our area?
Materials: Video, Photo, newspaper articles related to recent local extreme weather event, Science Notebooks, Pencils

Engage: Choose an extreme weather event that is most likely to occur where you live.
Explore: Students recall event. Ask students if event could have been prevented. Class discusses.
Explain: Class will create table on board to see which category their ideas fall into. Class watches Generation Genius Extreme Weather Solutions video as a group and discusses.
Elaborate: Class watches DIY activity and discusses.
Evaluate: Students choose extreme weather event and write a paragraph about how cause and effect relationships can be identified both between the natural hazard and its impact and between the engineered solution and how it lessens the impact on humans.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments

- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
No modifications. Students will follow along with the class. Teacher assistance as needed.

Tier III
No modifications. Students will follow along with the class. Teacher assistance as needed.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/extreme-weather-for-kids/

Day 8: Renewable & Nonrenewable Resources

Objective: I can compare the difference between renewable and nonrenewable resources.
Essential Question: What is the difference between renewable and nonrenewable resources?
Materials: Science notebooks, pencils

Engage: With a partner, read the labels on clothes and shoes. What materials were used to make your clothes. List them in chart and discuss as a class.

Explore: In groups, students will create a list of natural resources in the world that help us create our clothing, homes, and other things in our daily live.

Explain: Students will learn the difference between renewable and nonrenewable resources. They will watch a video that explains how fossil fuels are formed and why they cannot be replaced in our lifetime. Through this lesson, students gain an understanding of advantages and disadvantages of both renewable and nonrenewable resources, as well as examples of both. Students will watch a brainpop video and recall what was renewable or nonrenewable.

Elaborate: Students will research NJ as a class to determine which resources it produces. Then, students will be given a state with a partner to determine which resources are produced in that state.

Evaluate: Students will then work independently and be able to differentiate between renewable and nonrenewable resources by providing examples of each, and providing advantages and disadvantages of using each. Students will create and categorize resources into an appropriate venn diagram. (example shown here)

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Teacher assistance as needed.
Explain: No modifications.

Elaborate: Teacher assistance as needed.
Evaluate: Teacher assistance as needed.

Tier III
Engage: No modifications.
Explore: Teacher assistance as needed.
Explain: No modifications.
Elaborate: Small group with teacher to complete this activity.
Evaluate: Small group with teacher to complete this activity.

Day 9 & 10: Nearpod: Alternative Energy Renewable Resources
Objective: I can classify natural resources as renewable or nonrenewable.
I can describe the advantages and disadvantages of renewable energy.
I can explain the importance of conservation.
Essential Question: What are renewable resources?
Materials: Chromebook, Science Notebook, Pencil

Engage: Students will take a poll on what they know about renewable resources. Class will brainstorm a list of renewable resources.
Explore: Students will explore a the Field of Windmills and discuss what they think windmills do.
Explain: Class will review slideshow about resources and review key vocabulary essential to unit.
Elaborate: Students will match vocabulary to definition as a class. Class will watch a video on renewable resources.
Evaluate: Class will classify resources as renewable and nonrenewable into a chart.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments

- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: Pre teach vocabulary.
Elaborate: Pre teach vocabulary.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: No modifications.
Explain: Pre teach vocabulary.
Elaborate: Pre teach vocabulary.
Evaluate: No modifications.

Day 10
Engage: Students will select a renewable resources and describe the advantages and disadvantages of this resource.
Explore: Students will share their thoughts.
Explain: Students will learn about conservation through video and powerpoint.
Elaborate: Students will design a poster to communicate the importance of conservation. Students will present their poster.

Evaluate. Students will take a quiz to show their understanding of lesson.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: Teacher assistance as needed.
Explore: No modifications.
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: No modifications.

Tier III
Engage: Teacher assistance as needed.
Explore: No modifications.
Explain: No modifications.
Elaborate: Teacher assistance when needed.
Evaluate: Quiz read aloud.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=3f9be0b1b25601fa80a0fa38d2111766-1

Day 11: Nearpod: Renewable & Non-Renewable Energy
Objective: I can identify that to live, humans need resources found on earth and not all of these resources are renewable.
I can differentiate between renewable and non-renewable resources.
I can classify resources as renewable and non-renewable.
Essential Question: What are renewable and nonrenewable resources and how are they important to us?
Materials:

Engage: Class will review vocabulary. Then, they will use the vocabulary used to complete a fill-in-the-blank as a class.
Explore: Class will answer an open ended question.
Explain: Then, students will write and illustrate a definition for each word with a partner. Class will engage in a slideshow on renewable vs. nonrenewable energy.
Elaborate: Students will pair up to categorize examples of resources in a chart. Students will take a poll based on their understanding.
Evaluate: Students will complete open ended question based on their understanding of the lesson and complete a short quiz.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explain: No modifications.

Elaborate: Teacher assistance as needed.
Evaluate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.

Tier III
Engage: No modifications.
Explore: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.
Explain: No modifications.
Elaborate: Teacher assistance as needed.
Evaluate: When answering questions on the near pod, students will have the opportunity to answer using pictures, one word answers, text to speech or verbally.

Link to Lesson Activity: https://np1.nearpod.com/sharePresentation.php?code=917593f4cc5d7c3b267711a88c621e97-1

Day 12: Nearpod: Alternative Energy - Virtual Field Trip
Objective: I can identify sources of renewable energy and how they work.
Essential Question: What do we use energy for?
Materials: Chromebook

Engage: Students will take a poll on why they think it is important to have renewable energy. Class will review vocabulary and complete a fill-in-the-blank for the vocabulary.
Explore: Class will explore what we use energy for. Class will take a quiz on how they use energy in their home.
Students will write about their score and list one thing they learned from taking the quiz.
Explain: Class will discuss renewable energy.

Elaborate: Class will visit a wind farm, hydropower plant, and solar power plant through virtual reality. Then, they will explore geothermal energy and biomass. Class will review what they learned.
Evaluate: Students will complete memory game activity and take a quiz.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: No modifications.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: No modifications.

Tier III
Engage: No modifications.
Explore: Quiz will be read a loud.
Explain: No modifications.
Elaborate: No modifications.
Evaluate: Quiz will be read aloud.

Link to Lesson Activity: https://app.nearpod.com/presentation?pin=02392AE3CC6A6FB324D95782965154EE-1

Day 13, 14, 15: Generation Genius: Renewable vs Nonrenewable Resources
Objective: I can anaylze the types of fuel that is used to generate energy.
I can design, build, and present a renewable energy device.
I can list pros and cons of renewable and non-reneable energy.
Essential Question: How is fuel used to create energy?
Materials: Science Notebooks, Pencils

Engage: How did you come to school today? Did those ways of getting to school take energy? What kinds of energy?
Class will watch Generation Genius Video on Renewable Energy.
Class will create definitions of energy, fields, non-renewable energy, and renewable energy based on video.
Class will create a list with two columns - nonrenewable and renewable. Class will list types of fields and energy video showed.

Explore: Rewatch the DIY Waterwheel Segment of Generation Genius Video. Class will analyze device built. Teacher will introduce assignment students will be working on using Engineering Design Process to build their own device. Students will need to have designs and materials approved before building.

Explain: Class does gallery walk where each team explains their device. Class rewatches Generation Genius Renewable Resource Video. Class discusses discussion questions.
Elaborate: Class discusses environment impact made by each type of fuel and energy device in video. Class makes a list of impacts that may occur. Students write/draw at least one idea they have in their science notebooks.
Evaluate: Students complete exit ticket and teacher assesses student's science notebook.

Differentiation:
General Accommodations/Modifications:

- Extended time for assignments
- Alternative forms of assessment if appropriate

- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier II
Engage: No modifications.
Explore: Teacher assistance as needed.
Explain: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Elaborate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Evaluate: Students will have the opportunity to answer exit ticket verbally or using sentence starters and a word bank.

Tier III
Engage: No modifications.
Explore: Teacher assistance as needed.
Explain: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Elaborate: Students will have the opportunity to answer verbally or using sentence starters and a word bank.
Evaluate: Students will have the opportunity to answer exit ticket verbally or using sentence starters and a word bank.

Link to Lesson Activity: https://www.generationgenius.com/videolessons/renewable-vs-nonrenewable-energy-for-kids/

Unit Assessments: Nonrenewable Energy Device & Presentation, Conservation Poster & Presentation, Extreme Weather Research Project, Water Poster

Formative: Brainstorm to Activate Prior Knowledge, Live Poll, Live Quiz, Open Ended Questions, Quick Check, Ask/Answering Questions through Discussion, Teacher Observation of Individual & Group Work, Finger Signals

Summative: Lab Sheets, Lab Activities, Creating Diagrams, Science Notebook Journaling